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A STEADY STATE SEGMENTED ESTUARY MODEL

Ronald E. Bunce, et al

Federal Water Pollution Control Administration
Charlottesville, Virginia

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A STEADY STATE SEGMENTED ESTUARY MODEL

by

Ronald E. Bunce
Leo J. Hetling

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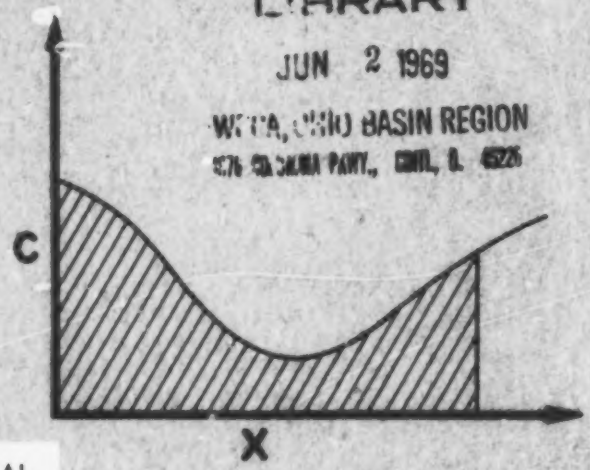

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I. INTRODUCTION

The "oxygen sag" equation developed in 1925 by Streeter and Phelps[1] has found widespread use in the analysis of a particular type of stream pollution problems. This mathematical model may be applied where the pollutant of concern is biologically degradable organic material which brings about a depression of the natural dissolved oxygen (DO) content of a stream.

The "oxygen sag" formula, however, is not applicable to tidal bodies of water, primarily because of the over-riding importance of turbulent diffusion in estuaries which is not normally taken into consideration in streams. In fresh water streams "plug flow," in effect, is assumed, and this is not an unreasonable assumption in most cases. Although longitudinal diffusion does in fact occur in streams due to horizontal and vertical velocity gradients, the longitudinal exchange which this brings about involves similar material; viz., the material that is "diffused" upstream is very nearly the same with respect to age, concentration, etc., as that which is "diffused" downstream. The net result is usually negligible in the analysis of stream pollution problems. Furthermore, advection, or transport downstream by the stream, produces a transfer of waterborne material which greatly exceeds the transfer brought about by diffusion. In estuaries, however, because of their relatively large cross-section and small net flow downstream, the advective transport is often quite small compared to the transfer of materials by turbulent diffusion. For this reason, the latter effect must be considered.

In 1960, 35 years after the development of the "oxygen sag" formula for streams, O'Connor[2] devised a similar mathematical model for estuaries which added to Streeter and Phelp's formula a term to account for longitudinal diffusion. As with the original stream sag formula, the O'Connor model is given as a differential equation which may be integrated to give a solution for the dissolved oxygen as a continuous function of distance along the longitudinal axis of the tidal estuary.

In 1963 Thomann[3] developed a computational procedure based upon the principles of systems analysis which incorporated the terms of the O'Connor model for estuaries. This method of computation employs an incremental or segmented approach where average conditions in a finite number of connected segments are determined rather than a continuous function solution. The degree of resolution possible in the solution is directly related to the number of segments chosen. This approach simplifies the mathematics involved and allows much greater flexibility in its use. The models previously cited apply to the one dimensional steady state case; whereas, with the segmented approach, a second or third dimension may be added, and the time dependent situation may also be investigated. Also, any pollutant for which the relationships affecting its behavior can be expressed mathematically can be incorporated into the segmented model.

The model has been described previously by Thomann[3], and solutions to the one-dimensional time-dependent model have been

programmed for both the digital and analog computer[4,5]. Applications of the model and methods of estimating required parameters also have been presented[6,7,8,9]. The purpose of this paper is to describe in detail the theory of the "Thomann Model" as applicable to the one-dimensional steady-state case of organic pollution of an estuary and to document a digital computer program developed to solve this case.

II. GENERAL APPROACH TO THE PROBLEM

A first step in the application of the model is to divide the estuary into a satisfactory number of segments. A mass balance for the pollutant is written for each segment. The results from these balance a series of equations equal in number to the number of segments. The only unknowns in these equations are the mean steady-state concentrations of the pollutant in each segment. Thus, a series of n equations with n unknowns is obtained where n is the number of segments. By combining terms, this series of equations may be expressed in matrix notation as:

$$AC = L \qquad 1$$

where A is a collection of known terms such as flow, diffusion constants, deoxygenation constants, and segment volumes in combinations having units of cubic foot/day. C is a vector matrix of unknown concentration of pollutants in pounds/cubic foot. The product of A and C is L, a vector of pollutant loads added directly to each segment expressed as pounds/day. The terms of the vector L have been referred to as forcing functions by Thomann.

The matrix of unknown concentrations, C, may be solved by inverting A, since:

$$C = LA^{-1} \qquad 2$$

where A^{-1}, the "unit loading matrix," is the inverse of A. C may then be obtained by performing the matrix multiplication of L times A^{-1} as indicated.

This is an extremely convenient arrangement since, once having solved for A^{-1}, it can be multiplied by any distribution of loads along the estuary as described by the vector L. Furthermore, because of the nature of A^{-1}, it is possible to determine easily what part of the resulting pollutant concentration in any one segment is due to a given discharge in any other segment. The unit loading matrix is essentially a table having n rows and n columns, the elements of which have the units lbs/cfs per lb/day discharged. Thus, $A_{4,7}$, the element in the fourth row and seventh column of the A^{-1} matrix, would give the numerical value for the concentration in segment 4 resulting from a discharge of one pound per day in segment 7. By multiplying the element, $A_{4,7}$, by the actual load applied to segment 7, the concentration in segment 4 resulting from that discharge will be obtained. If the estuary being studied has been modeled using correctly verified parameters, it will be possible to reproduce known pollutant distributions from known input loads. The verification step must be carried out with satisfactory results if the model is to be useful for predicting altered loading conditions expected in the future. That is to say, the computor model is no substitute for the great quantity of engineering field and office work required for any sound, scientific discussion.

Once a verified unit loading matrix is obtained, the pollutant distribution resulting from any loading pattern may be obtained.

In the analysis of oxygen conditions, it is necessary as a first step to multiply the unit loading matrix by the particular ultimate oxygen demand (UOD) loading conditions being studied. Having the UOD distribution among the segments, a mass balance may then be written for each segment incorporating the terms which affect the oxygen distribution, namely, advection, diffusion, deoxygenation, and reaeration. When applicable, terms describing uptake by benthal loads and the net effect of photosynthesis and respiration can also be included. Just as in the case of the pollutant distribution, these mass balances around each of n segments results in a series of n equations in n unknowns which are the DO concentrations being sought. Through the use of matrices, it is possible then to obtain a series of linear expressions for the DO in any segment as a function of the discharged loads, benthal uptake and photosynthetic effects in all other segments.

III. DETAILED DERIVATION

Having divided the estuary into n sections, a mass balance is written for the oxygen in the kth section (Figure 1). Assume the concentration of oxygen in each section is uniform and equal to C_k, the mean concentration in the section.

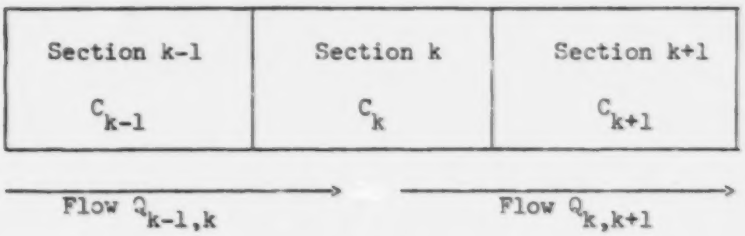


Figure 1

Oxygen can be gained or lost by several ways in Section k.

1. Advection into Section k from Section k-1 and out of Section k to Section k+1.
2. Diffusion into or out of Sections k-1 and k+1.
3. Reaeration of Section k from the atmosphere.
4. Use of oxygen in Section k by oxygen consuming waste (UOD).
5. Production of oxygen in Section k by photosynthesis.
6. Other mechanisms (benthol deposits, immediate oxygen demands, etc.).

Advection

In the system pictured below,

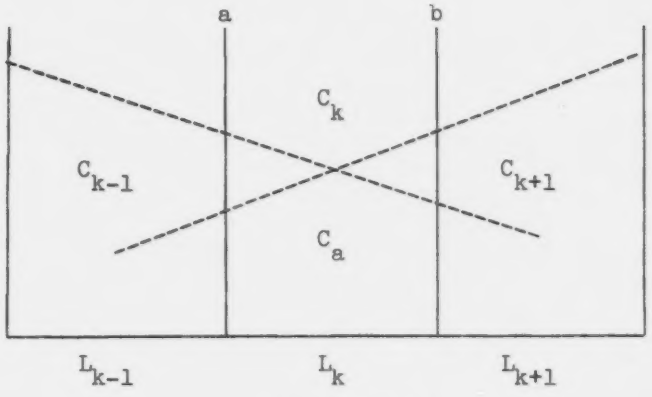


Figure 2

the C's represent mean concentrations in each segment of length, L.

If it is assumed that the concentration gradient through any two adjacent sections is approximated satisfactorily by a straight line, then the concentration at a boundary, a, between the two segments can be shown geometrically to be:

$$C_a = \frac{L_k\, C_{k-1} + L_{k-1}\, C_k}{L_k + L_{k-1}} \qquad 3$$

which can be written as:

$$C_a = \frac{C_{k-1}\, L_{k-1}}{L_{k-1} + L_k} + \frac{C_k\, L_k}{L_{k-1} + L_k} \qquad 4$$

or by letting

$$\xi_{k-1,k} = \frac{L_k}{L_{k-1} + L_k} \qquad 5$$

the concentration at the boundary may be expressed as:

$$C_a = \xi_{k-1,k}\, C_{k-1} + (1 - \xi_{k-1,k})\, C_k \qquad 6$$

The amount of material advected across boundary "a" is then given by:

$$A_{k-1,k} = Q_{k-1,k}\, [\xi_{k-1,k}\, C_{k-1} + (1 - \xi_{k-1,1})\, C_k] \qquad 7$$

where $\xi_{k-1,1}$ is defined as above.

For the case of boundary"b" the concentration gradient is rising and has a sign opposite to that passing boundary "a." In this case it can be shown that $\xi_{k,k+1}$ will be defined as:

$$\xi_{k,k+1} = 1 - \frac{L_{k+1}}{L_k + L_{k+1}} \qquad 8$$

or

$$\xi_{k,k+1} = \frac{L_k}{L_k + L_{k+1}} \qquad 9$$

For a falling gradient, then, ξ is defined by the ratio of the downstream segment length to the sum of the upstream and downstream lengths; whereas, for a rising gradient, ξ is defined by 1 minus this quantity or the ratio of the upstream length to the sum of the upstream and downstream lengths.

The above procedure may be used to find ξ subject to the restrictions that $\xi > 1 - \frac{E}{Q}$.

Following this derivation, the advection from Section k-1 to k becomes:

$$A_{k-1,k} = Q_{k-1,k} [\xi_{k-1,k} C_{k-1} + (1 - \xi_{k-1,1}) C_k] \quad 10$$

In a similar manner, the advection out of Section k into Section k+1 is:

$$A_{k,k+1} = Q_{k,k+1} [\xi_{k,k+1} C_k + (1 - \xi_{k,k+1}) C_{k+1}] \quad 11$$

Diffusion

The rate of diffusion from one section to another can be assumed to be proportional to the difference in concentration between the sections or:

$$D_{k-1,k} = E_{k-1,k} (C_{k-1} - C_k) \quad 12$$

$$D_{k,k+1} = E_{k,k+1} (C_{k+1} - C_k) \quad 13$$

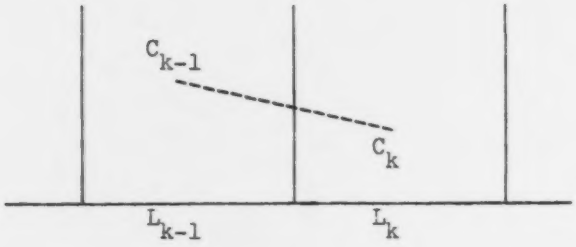
where E is an exchange factor related to the classical diffusion factor (K) by:

$$E_{k,k+1} = \frac{K_{k,k+1} A_{k,k+1}}{0.5 (L_k + L_{k+1})} \quad 14$$

This expression for E can be derived by assuming that diffusion proceeds according to Fick's first law, i.e.,

$$N = -K\frac{\partial C}{\partial X} \quad 15$$

where N is the time rate of transfer of substance per unit area, $\frac{M}{L^2T}$, and K is the coefficient of diffusion for the system shown below:



$$\frac{\partial C}{\partial X} = \frac{C_{k-1} - C_k}{1/2L_{k-1} + 1/2L_k} \qquad 16$$

and

$$N = K \left[\frac{(C_{k-1} - C_k)}{1/2\ (L_{k-1} + L_k)}\right] \qquad 17$$

D, the total time rate of transfer of substance across the boundary between Segment k-1 and K which has a cross-sectional area A is given by:

$$D = AN \qquad 18$$

$$= \frac{AK\ (C_{k-1} - C_k)}{1/2(L_{k-1} + L_k)} \qquad 19$$

or

$$D = E_{k-1,k}\ (C_{k-1} - C_k) \qquad 20$$

where

$$E_{k-1,k} = \frac{KA}{1/2\ (L_{k-1} + L_k)} \qquad 21$$

If E is taken as positive, the direction of the diffusion will be fixed by the relative magnitude of C_{k-1}, C_k, and C_{k+1}.

Reaeration

The rate of reaeration (r_k) into Section k may be expressed as being proportional to the difference in the actual oxygen concentration and the oxygen saturation value C_{sc}.

$$R_k = r_k V_k (C_{sc} - C_k) \qquad 22$$

BOD

The rate of utilization of oxygen by the UOD present is expressed as:

$$B_k = V_k \, d_k(t) \, L_k(t) \qquad 23$$

where $d_k(t)$ = the decay coefficient (k_1) in Section k at time t.

$L_k(t)$ = the UOD in Section k at time t.

Other Sources and Sinks

The effect of algae, benthal deposits, COE, and any other sources or sinks of oxygen in Section k will be expressed as $S_k(t)$. Later it may be desirable to separate these effects and treat them separately; but for the present, in order to keep the analysis tractable, they will be considered together.

If an equation is now written for all the sources and sinks of oxygen in Section k, the following differential equation for the mass rate of change in Section k is obtained.

$$V_k \frac{dC_k}{dt} = Q_{k-1,k} [\xi_{k-1,k} C_{k-1} + (1 - \xi_{k-1,k}) C_k]$$
$$- Q_{k,k+1} [\xi_{k,k+1} C_k + (1 - \xi_{k,k+1}) C_{k+1}] \quad 24$$
$$+ E_{k-1,k} (C_{k-1} - C_k) + E_{k,k+1} (C_{k+1} - C_k)$$
$$+ r_k V_k [C_{sc}(t) - C_k] - V_k d_k(t) L_k(t)$$
$$- S_k(t)$$

or rearranging:

$$-V_k \frac{dC_k}{dt} + Q_{k-1,k} \xi_{k-1,k} C_{k-1} + Q_{k-1,k} (1 - \xi_{k-1,k}) C_k$$
$$-Q_{k,k+1} \xi_{k,k+1} C_k - Q_{k+1} (1 - \xi_{k,k+1}) C_{k+1} \quad 25$$
$$+E_{k-1,k} C_{k-1} - E_{k-1,k} C_k + E_{k,k+1} C_{k+1} - E_{k,k+1} C_k$$
$$- V_k r_k C_k + -r_k V_k C_{sc}(t) + V_k d_k(t) L_k(t) + V_k S_k(t)$$

Factoring out C_k's and multiplying through by -1:

$$- [Q_{k-1,k} \xi_{k-1,k} + E_{k-1,k}] C_{k-1} - [V_k \frac{d}{dt} + Q_{k-1,k} (1 - \xi_{k-1,k})]$$
$$- Q_{k,k+1} \xi_{k,k+1} - E_{k-1,k} - E_{k,k+1} - r_k V_k C_k \quad 26$$
$$- C_{k-1} [-Q_{k,k+1} (1 - \xi_{k,k+1}) + E_{k,k+1}] = r_k V_k C_{sc}(t)$$
$$- V_k d_k(t) L_k(t) - S_k(t)$$

Letting

$$a_{k-1,k} = -[Q_{k-1,k} \xi_{k-1,k} + E_{k-1,k}] \quad 27$$

$$a_{kk} = [-Q_{k-1,k} (1 - \xi_{k-1,k}) + Q_{k,k+1} \xi_{k,k+1} + E_{k-1,k} \quad 28$$
$$+ E_{k,k+1} + r_k V_k - V_k \frac{d}{dt}]$$

$$a_{k,k+1} = [Q_{k,k+1} (1 - \xi_{k,k-1}) - E_{k,k+1}] \quad 29$$

the mass balance equation reduces to:

$$a_{k-1,k}\, C_{k-1} + a_{k,k}\, C_k + a_{k,k+1}\, C_{k+1} =$$

$$-r_k V_k C_{sc}(t) + V_k d_k(t)\, L_k(t) + S_k(t)\, V_k \qquad 30$$

If steady state conditions are assumed:

$$\frac{d}{dt} = 0 \qquad 31$$

$$C_{sc}(t) = C_{sc} \qquad 32$$

$$d_k(t) = d_k \qquad 33$$

$$L_k(t) = L_k \qquad 34$$

$$S_k(t) = S_k \qquad 35$$

therefore:

$$a_{kk} = [Q_{k,k+1}\, \xi_{k,k+1} = Q_{k-1,k}\, (1 - \xi_{k-1,k}) + E_{k-1,k}$$

$$+ E_{k,k+1} + r_k\, V_k] \qquad 36$$

and

$$a_{k-1,k}\, C_{k-1} + a_{kk}\, C_k + a_{k,k+1} - r_k\, V_k\, C_{sc} + V_k\, d_k\, L_k + S_k\, V_k = P_k \qquad 37$$

Assuming appropriate boundary conditions, i.e., C_0 and C_{n+1} and writing mass balance equations for each section, we obtain an equation of the following type:

$$
\begin{aligned}
a_{11}C_1 + a_{12}C_2 &= P_1 \\
a_{12}C_1 + a_{22}C_2 + a_{23}C_3 &= P_2 \\
a_{23}C_2 + a_{33}C_3 + a_{34}C_4 &= P_4 \\
\text{"} \quad \text{"} \quad \text{"} \quad &\text{"} \\
\text{"} \quad \text{"} \quad \text{"} \quad &\text{"} \\
\text{"} \quad \text{"} \quad \text{"} \quad &\text{"} \\
a_{n-1,n}C_{n-1} + a_{n,n}C_n &= P_n
\end{aligned}
\qquad 38
$$

or in a matrix notation

$$
\begin{bmatrix}
a_{11} & a_{12} & 0 & . & . & . & 0 \\
a_{21} & a_{22} & a_{23} & . & . & . & 0 \\
0 & a_{32} & a_{33} & & & & 0 \\
. & . & . & . & . & . & . \\
. & . & . & . & . & . & . \\
. & . & . & . & . & . & a_{n-1,n} \\
0 & & & a_{n,n-1} & & & a_{nn}
\end{bmatrix}
\begin{bmatrix} C_1 \\ C_2 \\ C_3 \\ . \\ . \\ . \\ C_n \end{bmatrix}
=
\begin{bmatrix} P_1 \\ P_2 \\ P_3 \\ . \\ . \\ . \\ P_n \end{bmatrix}
\qquad 39
$$

$$A\,C = F \qquad 40$$

$$C = F\,A^{-1} \qquad 41$$

The system can thus be solved for all values of C by finding the inverse of the matrix A. Matrix inversion, although time-consuming by hand, can be accomplished easily by high speed digital computers.

IV. MATHEMATICAL TECHNIQUE EMPLOYED IN THE MODEL FOR MATRIX INVERSION

The matrix of coefficients we are dealing with in the program is of a particular type. The system of equations is tridiagonal since the matrix of unknowns is tridiagonal, i.e., each element is zero except the main diagonal and its adjacent diagonals.

The solution to such a system is conveniently handled on the computer by solving for the inverse employing a tridiagonal technique.

This may be illustrated by an example:

$$\begin{bmatrix} C_1 & q_1 & 0 & 0 \\ p_1 & C_2 & q_2 & 0 \\ 0 & p_2 & C_3 & q_3 \\ 0 & 0 & p_3 & C_4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \end{bmatrix} \qquad 42$$

Now define an S sequence recursively by:

$$S_1 = C_1 \qquad 43$$

$$S_2 = C_2 - \frac{p_1 q_1}{S_1} \qquad 44$$

$$S_3 = C_3 - \frac{p_2 q_2}{S_2} \qquad 45$$

" "

" "

" "

$$S_k = C_k - \frac{p_{k-1}\, q_{k-1}}{S_{k-1}} \qquad 46$$

" "

" "

" "

$$S_n = C_n - \frac{p_{n-1}\, q_{n-1}}{S_n} \qquad 47$$

In terms of this sequence, define the sequence K by:

$$K_1 = b_1 \qquad 48$$

$$K_2 = b_2 - \frac{p_1\, k_1}{S_1} \qquad 49$$

" "

" "

" "

$$K_i = b_i - \frac{p_{i-1}\, k_{i-1}}{S_{i-1}} \qquad 50$$

" "

" "

" "

$$K_n = b_n - \frac{p_{n-1}\, k_{n-1}}{S_{n-1}} \qquad 51$$

The solution to the set of equations can now be written down by means of a backward sweep as follows:

NOTE: We illustrate by means of a 4x4. The generalization is obvious.

$$X_4 = \frac{K_4}{S_4} \qquad 52$$

$$X_3 = \frac{K_3 - q_3 X_4}{S_3} \qquad 53$$

$$X_2 = \frac{K_2 - q_2 X_3}{S_2} \qquad 54$$

$$X_1 = \frac{K_1 - q_1 X_2}{S_1} \qquad 55$$

The above procedure is well known. In order to prove this, we note that the forward sweep corresponds to taking the i-th row, multiplying it by $\frac{-C_i}{P_i}$, and adding it to the i+i-th row as i advances from 1 to n. This procedure triangularizes the matrix, i.e., it is reduced to:

$$\begin{bmatrix} S_1 & q_1 & 0 & 0 \\ 0 & S_2 & q_2 & 0 \\ 0 & 0 & S_3 & q_3 \\ 0 & 0 & 0 & S_4 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \end{bmatrix} = \begin{bmatrix} K_1 \\ K_2 \\ K_3 \\ K_4 \end{bmatrix} \qquad 56$$

The backward sweep is now clear. Obviously now X_3 is determined since X_4 is known, etc.

V. PREPARATION OF THE COMPUTER PROGRAM

The program was written in Fortran IV and originally run on the IBM 7094 at the National Bureau of Standards in Washington, D. C. The more recent version presented here was run on the IBM 360 system at the U. S. Geological Computer Center, Washington, D. C. Though Fortran programs will run on any installation that maintains a Fortran compiler, it usually requires a number of changes to be made when switching from one system to another. Generally, these changes require an understanding of the installation's job control language, together with the particular level of the compiler.

In developing the program and in the choice of mnemonics, an effort was made to make the program as compatible as possible with the time dependent model previously programmed by Jeglic.[4]

The complete program deck structure is shown in Figure 3. The entire package consists of one main program and eight sub-routines. The main program calls these various sub-routines as they are needed and controls the actual operating features and cycling. The sub-routine POLYB reads in coefficients and the powers of polynomian equations when the vectors for reaeration, decay, and dissolved oxygen are to be generated rather than read in as input data. The sub-routine PRELIM reads in various vector quantities and prepares the coefficients of the matrix and other required vectors. Sub-routine PRECAL loads the calculated matrix elements in their proper positions and returns control to the

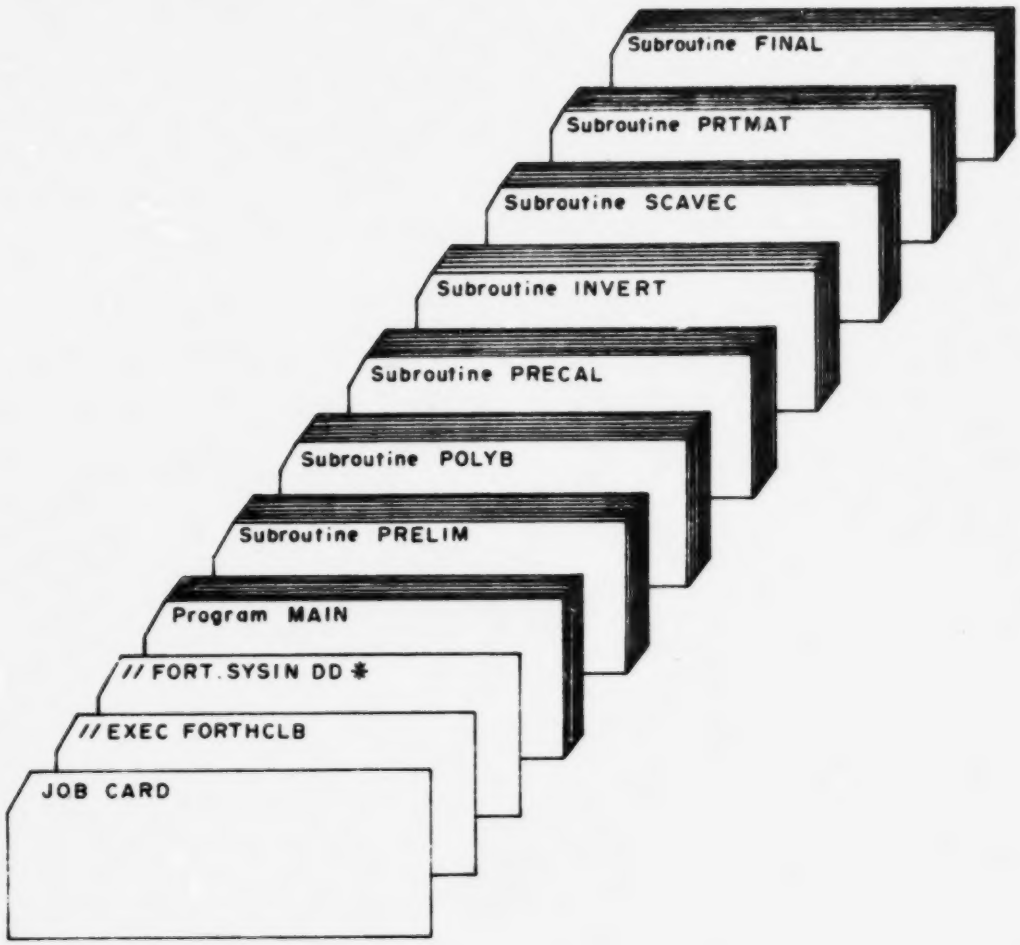


FIGURE 3.

PROGRAM DECK STRUCTURE

main program, which then calls the matrix inversion program. This sub-routine then inverts the tridiagonal matrix. The sub-routine SCAVEC performs the calculations on the inverted matrix that have been specified in the control card. PRTMAT is a general sub-routine used to print the inverted matrix and could be used to print any matrix with five elements printed per row per page. Sub-routine FINAL is used only when both the A and B matrix inversions have been specified for a single case of input data.

PRECFN is employed to adjust the vectors with proper dimensions when it is more convenient to enter the vectors in units other than those employed in the actual calculations. This allows the analyst to enter a conversion constant into the program when the source data set up is in other units.

As shown in Figure 3, the first card of the program deck is the job control card. The card format for this card at the U.S.G.S. Computer Center where the program was run is as follows:

JOB CONTROL CARD

Card Columns	Required Information
1 - 2	//
3	Center Code: For use in conjunction with the job or program number to identify the center originating or assigning the job or program number.
4 - 5	Federal Agency code
6 - 8	User Registration Code: Individual users registration code. To be assigned by Computer Center Division.

JOB CONTROL CARD (Continued)

Card Columns	Required Information
9 - 10	User's ID: This is structly a user's ID to uniquely identify submissions of data to the Computing Center. The only caution to be observed by the user is when two sets of data for the same program are submitted simultaneously, then different alphanumeric characters should be punched in columns 9 - 10.
11	Blank column
12-14	JOB (e.g., the word JOB)
15	Blank column
16	((left parenthesis)
17 - 20	Program Number: Four digit numeric job or program number assigned by the Computer Center Division at each field center and Washington, D. C. When a new number is assigned at any field center, the attached Program Registration Form should be completed in duplicate and transmitted to the Computer Operations Branch, Washington, D. C.
21	, (comma)
22 - 25	User assigned auxiliary account number. Four alphanumeric characters chosen by the user according to any method he chooses. Accounting data will be sequenced and subtotaled by this number for user information.
26	, (comma)
27 - 30	Estimated execution time in minutes. Requires four numeric digits.
31	, (comma)
32 - 35	Estimated lines of print expressed in thousands of lines. Requires four numeric digits (e.g., 0001 = 1000 lines of print).
36	, (comma)

JOB CONTROL CARD (Continued)

Card Columns	Required Information
9 - 10	User's ID: This is structly a user's ID to uniquely identify submissions of data to the Computing Center. The only caution to be observed by the user is when two sets of data for the same program are submitted simultaneously, then different alphanumeric characters should be punched in columns 9 - 10.
11	Blank column
12-14	JOB (e.g., the word JOB)
15	Blank column
16	((left parenthesis)
17 - 20	Program Number: Four digit numeric job or program number assigned by the Computer Center Division at each field center and Washington, D. C. When a new number is assigned at any field center, the attached Program Registration Form should be completed in duplicate and transmitted to the Computer Operations Branch, Washington, D. C.
21	, (comma)
22 - 25	User assigned auxiliary account number. Four alphanumeric characters chosen by the user according to any method he chooses. Accounting data will be sequenced and subtotaled by this number for user information.
26	, (comma)
27 - 30	Estimated execution time in minutes. Requires four numeric digits.
31	, (comma)
32 - 35	Estimated lines of print expressed in thousands of lines. Requires four numeric digits (e.g., 0001 = 1000 lines of print).
36	, (comma)

JOB CONTROL CARD (Continued)

Card Columns	Required Information
37 - 40	Estimated number of cards to be punched. Requires four numeric digits and is an exact number (e.g., 0100 = 100 cards).
41	, (comma)
42	Reserved for future use - must be 1.
43	, (comma)
44	Reserved for future use - must be 1.
45	, (comma)
46	Type run. C = Compile only T = Test of program P = Production use of program D = Data conversion required to convert from prior systems
47	) (right parenthesis)
48	, (comma)
49	' (single quote)
50 - 70	Programmer or user's name. May be from 1 to 20 characters, with or without imbedded blanks. Must be followed by one single quote ('). This field is required and cannot exceed 20 characters. If the user requires additional information in the JOB card, the following rules apply: (e.g., MSGLEVEL - 1 or other comments). A - Place a comma immediately following the trailing quote after name field. B - Punch any alphanumeric character into column 72 - Do Not Use this column for any other purpose.

C - Punch // in columns 1 and 2 of a second card.

D - Columns 3 - 15 MUST BE BLANK.

E - If MSGLEVEL = 1 is desired, it must be punched in columns 16 - 25 and followed by one or more blanks prior to any other comments.

F - If comments only are desired, leave column 16 blank and start the comment in column 17.

G - Column 72 of the second card MUST BE BLANK.

The second card in the program source deck is the EXEC statement card. The EXEC statement indicates the beginning of a job step and describes that job step. For the program here, the EXEC statement should appear as:

```
Columns No.  1 2 3 . . . . . .
             / / b E X E C b F O R T H C L G
```

(b = blank)

The third card in the program contains the following:

```
Columns No.  1 2 3 4 5 . . . . . .
             / / F O R T . S Y S I N b D D b *
```

(b = blank)

The statement specifies the location of the source module(s) or the object module(s) to the control program.

VI. INPUT DATA PREPARATION AND PROGRAM CASE CONTROL

A. General

The model contains the feature of running any number of cases during a production run. The original run would consist of placing the FORTRAN source program before the data deck. Subsequent computer runs would use the binary deck (called the object program) in front of the data.

Appendix III shows a typical data deck structure. The first card in the deck contains the number of cases to be run. This variable* is identified by the name NCASES. The first three columns on the card are used to enter the value. It is possible to run 999 cases on an individual computer run.

The format for this card is:

CARD COLUMNS	1	2	3	4	5	.	.	.	.
				8					

Note that for the sample shown, the program would operate on 8 data sets before termination. In entering data for the number of cases, the value should always be right justified. If, for example, the 8 were inadvertently entered in column 2, the program would try to operate on 80 sets of information rather than the 8 desired.

The second card in the data deck is the date card. This should be given as the date the computer run will be made. Its

---

* The word "variable" is not used in the normal mathematical sense.

main use is to quickly identify the computer run since, in most simulation modeling, input information will be adjusted upon analysis of initial output, and at a later time the analyst may want to refer to prior runs.

The numeric values and special symbols normally used to write the date may be entered as:

5/17/67 (Starting in column 1)
or 05/17/67 (Starting in column 1)

The date may be entered in columns 1 to 24 on the card, but for use of identification, it would be convenient to establish a definite entry technique as shown above.

The third card in the data deck should contain the name of the user. Again 24 columns are employed, and the entry may appear in any of the card columns 1 through 24.

The fourth card in the data deck is the title card. This card is employed to identify the first set of data the program will operate on. Note in Appendix III that each subsequent set of input data contains a title card. Card columns 1 through 22 are employed. The data may be numeric or alphabetic.

The title card and its subsequent set of data may be considered as a separate subdivision from the entire data deck. In practice, the title card and its associated input data is a subset of the input deck; therefore, the following discussion will outline the subset structure.

B. Namelist Input

1. General Description of Namelist Input With Rules

The namelist input mode was chosen in order to avoid the detail necessary to code input data into a definite format structure. Under NAMELIST options, the data to be entered into the computer is loaded in memory without the use of explicit lists.

The general form of the NAMELIST statement is:

$$\text{NAMELIST/name}_1\text{V}_1, \text{V}_2, \text{V}_3, \ldots, \text{V}_n/\text{name}_2/\text{W}_1, \text{W}_2, \ldots, \text{W}_n$$

Here name_i is the name of the list of variables whose names are specified by V_i, W_i. The name of the NAMELIST may be from one to six characters in length.

In order to understand the data entry for a variable associated with a NAMELIST, the following general requirements must be satisfied:

a. Only columns 2-72 of the data cards may be used.

b. Columns 73-80 may be used for card sequencing or identification but will be ignored by the computer.

c. Each NAMELIST begins with an ampersand (&) in column 2, followed by the NAMELIST name, and followed by at least one blank.

d. The NAMELIST is terminated by an ampersand (&) in any column 2-72.

e. All entries are separated by commas; the last entry must also be followed by a comma.

f. Blanks may not be imbeded before or after the = sign. (Ex. A = 5.0, is illegal and should be punched as: A=5.0,)

g. Blanks may be embedded between data values after the first value of vectors or arrays as shown below:

(X=1.2,1.3,1.5 2.2,2.3,2.5,)

h. Exponential notation may be used for large or small values, i.e., 2.153E5 and 2.154E-2 denote 215300 and 0.02154.

i. If the decimal point is omitted, it is assumed to be at the extreme right.

j. No decimal point may be used in the entries of variables typed integer.

k. When an array name appears without subscripts, all elements in the array must be present.

l. To enter the same value in several elements of an array, the data card may be set up as follows:

If X is dimensioned as X (10); then

X-1.4,2.4,6.3,5*6,.2,7.1,8.5,

2. Description of Namelist and Variables Used in This Program

a. NAMELIST CF

This namelist deals with the problem controls and conversion factors.

NSECTS (integer)	- Number of estuarine segments
IMAT (integer)	- Program Control for A and/ or B matrix
INDEX (i)(integer)	- Printing Option Control
ITP (i)(integer)	- Control value variable employed by polynomial sub-routine and temperature conversion control
CFQ (real)	- Advection conversion constant employed in sub-routine PRECFM

CFLEN (real) - Length conversion constant employed in sub-routine PRECFM

CFK (real) - Diffusion conversion constant employed in sub-routine PRECFM

CFL (real) - UOD conversion constant employed in sub-routine PRECFM

CFAREA (real) - Area conversion constant employed in sub-routine PRECFM

CFVOL (real) - Volume conversion constant employed in sub-routine PRECFM

CFP (real) - Dissolved oxygen sink and source conversion constant employed in sub-routine PRECFM

The above CF namelist is developed for each data set.

INDEX controls the printing of information with regard to a particular state of IMAT. In the event that IMAT would equal 1, two sets of information may be optionally printed, i.e., ALPHA x A^{-1} or ALPHA x VECTOR (L) x A^{-1}. If IMAT would equal 2, then the index would optionally be used to print ALPHA x B^{-1} or ALPHA x F x B^{-1}. In the third state, i.e., IMAT = 3, the INDEX option allows printing of ALPHA x A^{-1}, ALPHA x L x A^{-1}, ALPHA x B^{-1}, ALPHA x F x B^{-1}, ALPHA x A^{-1} x B^{-1}, VD $A^{-1}B^{-1}$, LVD A^{-1} B^{-1}, and D.O. Sat. + ALPHA x F x B^{-1} - LVD A^{-1} B^{-1}. IMAT and the index values will be discussed in greater detail later in this section.

A large number of possible combinations of output may be obtained. A typical output is shown in Appendix III, and each case shown here has been verified. Case K in the Appendix shows the results for IMAT = 3 and all INDEXES 1 through 8 set equal to 1.

The ITP variable is entered on the card following the INDEX control card. Two values should always be given for this variable. If ITP (2) is set equal to 1, the polynomial sub-routine is called. This sub-routine, discussed in Section V, generates the reaeration, dissolved oxygen at saturation, and the decay vector. If ITP (1) is set equal to 1, the temperature vector may be given in degrees Fahrenheit and is converted in the sub-routine to degrees Centigrade.

The conversion constants CFQ, CFLEN, CFK, CFL, CFAREA, CFVOL, and CFP are entered in succeeding cards. These constants are employed to convert their corresponding vectors to the proper units so that the actual vector input data may be entered in any units providing the corresponding conversion factor is given. In the event that the original input vectors are already in the proper units, the corresponding conversion factor would be set equal to 1.

b. NAMELIST RIVER

This namelist contains the parameters which describe the geometry of the river and the waste loadings to the system.

Q (i)(real) - $Q_{i-1,i}$, net flow of the estuary between segments i-1 and i, expressed in cubic feet per second. All boundaries, including the flow into the first and the flow out of the last segment, must be specified.

LENGTH (i)(real) - L_{i-1}, length of the estuary segments. Since a length above the uppermost segment and below the lowermost segment is required (see equations 9 and 19), n + 2 lengths must be specified. The input must be in feet. If other units are to be used, the proper conversion factor CFLEN (Namelist CF) must be used.

VOL (i)(real) - V_i, volume of section i in cubic feet. All sections must be specified. If units other than cubic feet are used, a suitable conversion factor must be specified (CFVOL in namelist CF).

AREA (i)(real) - $A_{i-1,i}$, cross-sectioned area of the interface between segments i-1 and i, in square feet. All interfaces, including the first and last, must be defined. Conversion factor CFAREA may be used.

DIFFCO (i)(real) - $K_{i-1,i}$, longitudinal dispersion coefficient between segments i-1 and i in square miles per day. All segment boundaries, including the first and last, must be specified. Conversion factor CFK is available if different units are used.

L (i)(real) - L_i, ultimate oxygen demand being discharged to segment i in pounds per day. All segments must be defined. Conversion factor CFL may be used if desired.

P (i)(real) - P_i, other sources or sinks of oxygen in segment i, in pounds per day. All segments must be defined even if all values are zero or meaningless. Conversion factor CFP is available.

c. NAMELIST RIVTO

This namelist is used if one wishes to specify definite values for the ultimate oxygen demand decay rate, the reaeration rate and the saturation value of oxygen in each segment.

DISOXS (i)(real) - C_{sc}, the saturation value of dissolved oxygen in segment i. All segments must be defined. The values must be entered in mg/l.

REAERK (i)(real) - r_i, the reaeration coefficient for segment i in units of 1/day. All segments must be defined.

DECAYK (i)(real) - d_i, the ultimate oxygen demand decay rate in segment i also with units of 1/day. All segments must be defined.

d. NAMELIST R R

This namelist is used if one wishes to generate the values of the ultimate oxygen demand decay rate, the reaeration rate and the saturation value of oxygen from the river temperature using polynomials.

T P (i)(real) - The temperature of the water in segment i. The temperature may be given in degrees Centigrade if ITP (2) in namelist CF is set equal to 0 or in degrees Fahrenheit if ITP (2) in namelist CF is set equal to 1.

K D (Integer) - The order of the polynomial which is being used to describe the decay rate.

C D (j)(real) - Polynomial coefficient of the jth term in the polynomial which is being used to describe the decay rate. C D must be defined for all values of $J \leq K\ D + 1$.

K R (integer) - The order of the polynomial which is being used to describe the reaeration rate.

C R (j)(real) - Polynomial coefficient of the jth term in the polynomial which is being used to describe the reaeration rate. C R must be defined for all values of $j \leq K R + 1$.

K C (integer) - The order of the polynomial which is being used to describe the dissolved oxygen saturation value.

C C (j)(real) - Polynomial coefficient of the jth term in the polynomial which is being used to describe the dissolved oxygen saturation value. C C must be defined for all values of $j \leq K C + 1$.

In order to understand the arrangement of the various NAMELISTS in the input data structure, the following explanation should prove helpful:

Consider the following:

1. CF Namelist (Always First and Present)
2. RIVER Namelist
3. RIVTO Namelist
4. R R Namelist

1. CF is always first and present.

Now, if ITP (2) = 0, NAMELIST R R is second, NAMELIST RIVER is third, and RIVTO is not required.

If ITP (2) = 1, RIVER is second, RIVTO is third, and RR is not required.

VII. BIBLIOGRAPHY

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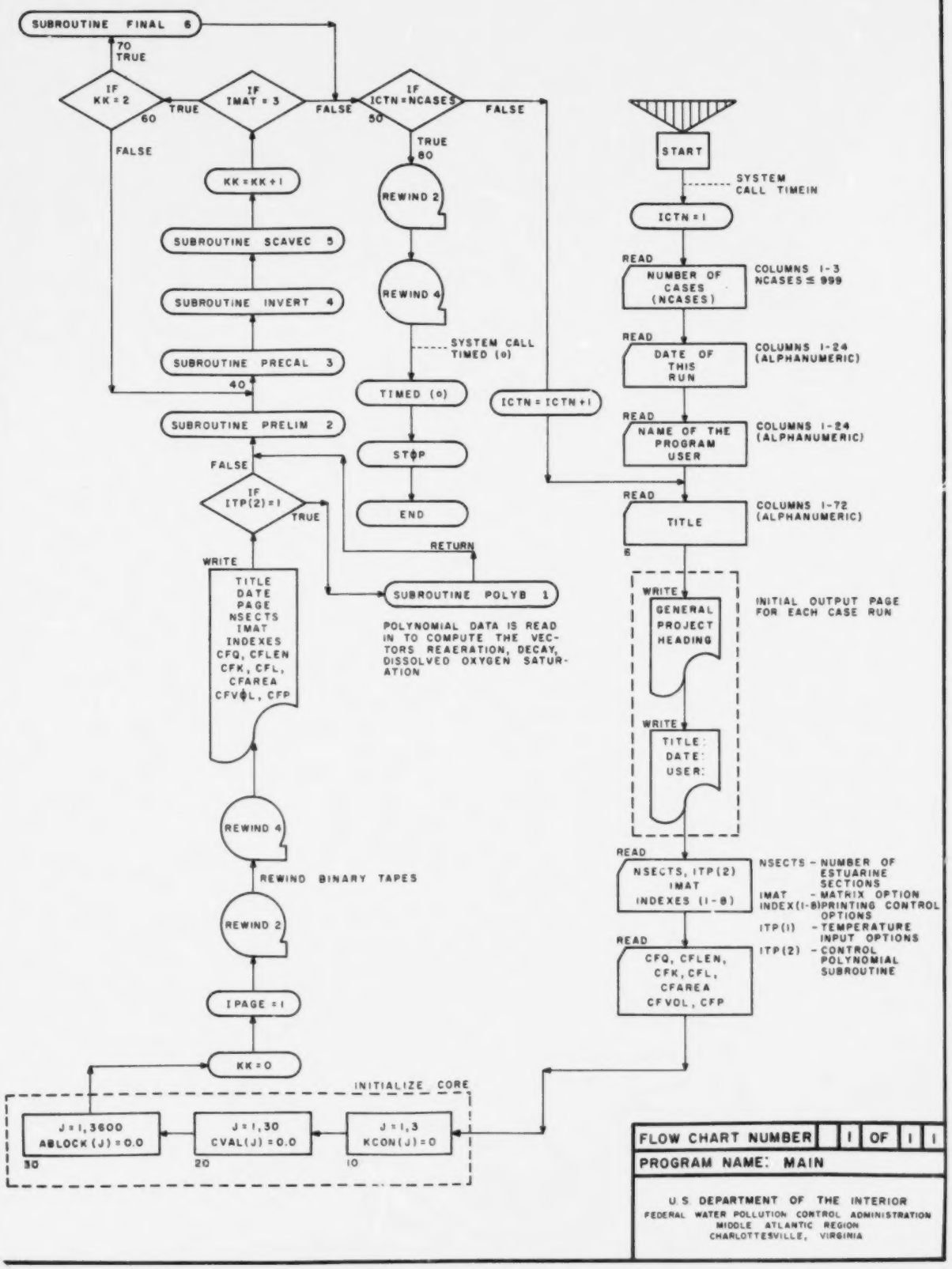
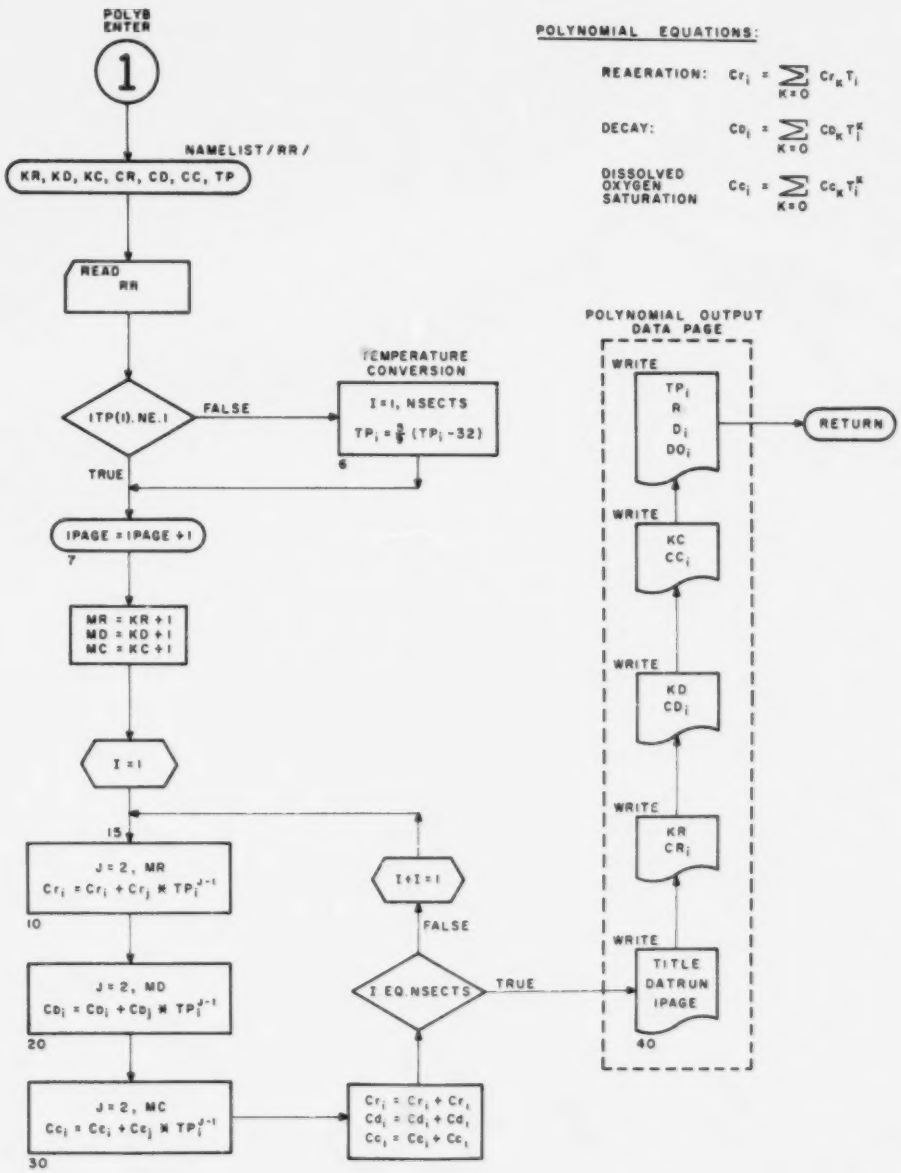
APPENDIX I

PROGRAM

FLOW DIAGRAMS


SUBROUTINE FINAL 6
70
TRUE
IF KK = 2
60
TRUE
IF IMAT = 3
FALSE
IF ICTN=NCASES
50
FALSE
TRUE
80
FALSE
KK = KK + 1
REWIND 2
SUBROUTINE SCAVEC 5
REWIND 4
SUBROUTINE INVERT 4
SYSTEM CALL TIMED (0)
SUBROUTINE PRECAL 3
40
TIMED (0)
ICTN = ICTN + 1
SUBROUTINE PRELIM 2
STOP
FALSE
IF ITP(2) = 1
TRUE
END
RETURN
WRITE
TITLE DATE PAGE NSECTS IMAT INDEXES CFQ, CFLEN CFK, CFL, CFAREA CFVOL, CFP
SUBROUTINE POLYB 1
POLYNOMIAL DATA IS READ IN TO COMPUTE THE VECTORS REAERATION, DECAY, DISSOLVED OXYGEN SATURATION
REWIND 4
REWIND BINARY TAPES
REWIND 2
IPAGE = 1
KK = 0
INITIALIZE CORE
J = 1,3600
ABLOCK(J) = 0.0
30
J = 1,30
CVAL(J) = 0.0
20
J = 1,3
KCON(J) = 0
10
START
SYSTEM CALL TIMEIN
ICTN = 1
READ
NUMBER OF CASES (NCASES)
COLUMNS 1-3
NCASES ≤ 999
READ
DATE OF THIS RUN
COLUMNS 1-24
(ALPHANUMERIC)
READ
NAME OF THE PROGRAM USER
COLUMNS 1-24
(ALPHANUMERIC)
READ
TITLE
COLUMNS 1-72
(ALPHANUMERIC)
6
WRITE
GENERAL PROJECT HEADING
WRITE
TITLE:
DATE:
USER:
INITIAL OUTPUT PAGE FOR EACH CASE RUN
READ
NSECTS, ITP(2) IMAT INDEXES (1-8)
NSECTS - NUMBER OF ESTUARINE SECTIONS
IMAT - MATRIX OPTION
INDEX(1-8) PRINTING CONTROL OPTIONS
ITP(1) - TEMPERATURE INPUT OPTIONS
ITP(2) - CONTROL POLYNOMIAL SUBROUTINE
READ
CFQ, CFLEN, CFK, CFL, CFAREA CFVOL, CFP
FLOW CHART NUMBER 1 OF 1 1
PROGRAM NAME: MAIN
U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION
CHARLOTTESVILLE, VIRGINIA



POLYNOMIAL EQUATIONS:

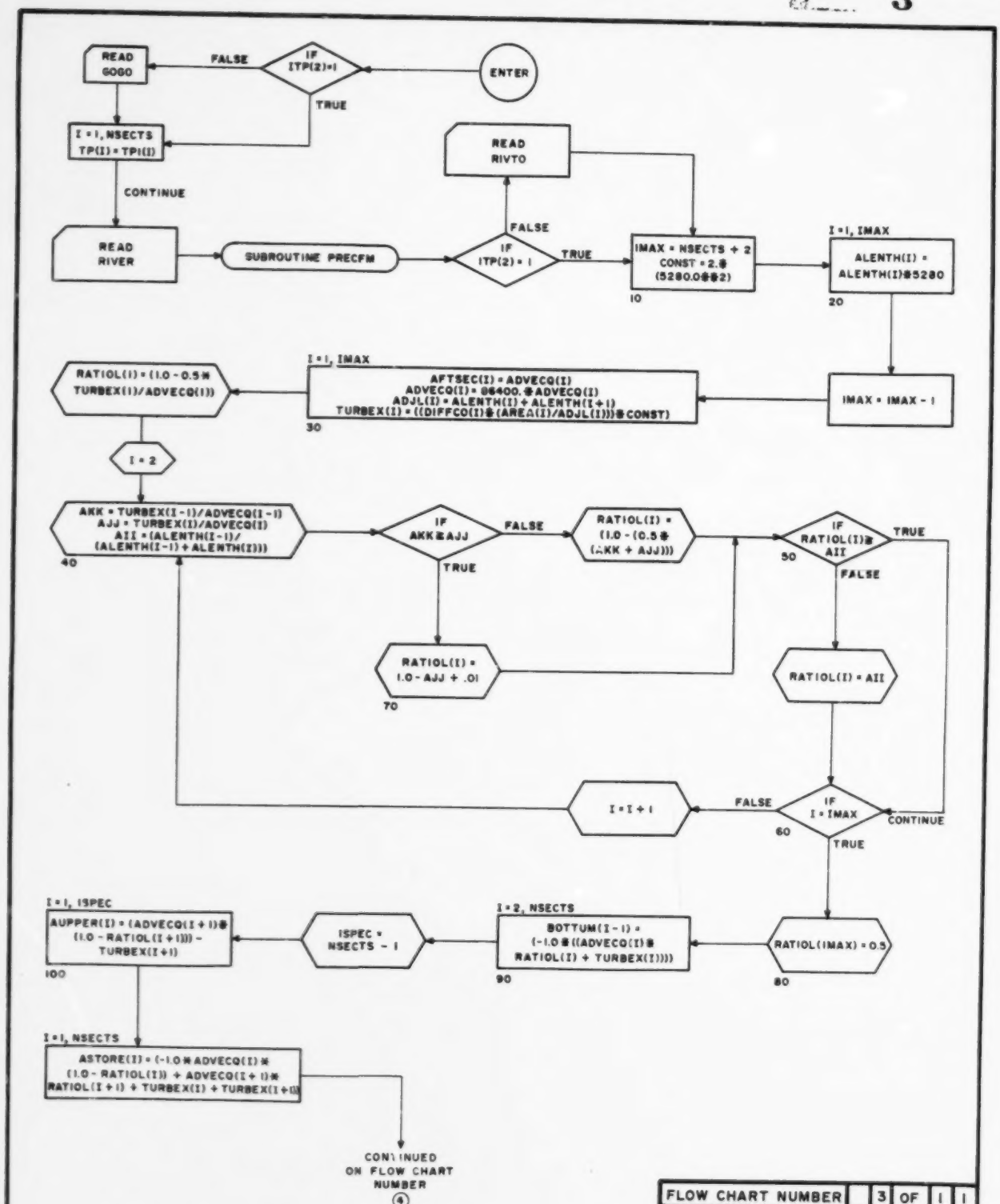
REAERATION: $Cr_i = \sum_{K=0} Cr_K T_i$

DECAY: $Cd_i = \sum_{K=0} Cd_K T_i^K$

DISSOLVED OXYGEN SATURATION: $Cc_i = \sum_{K=0} Cc_K T_i^K$

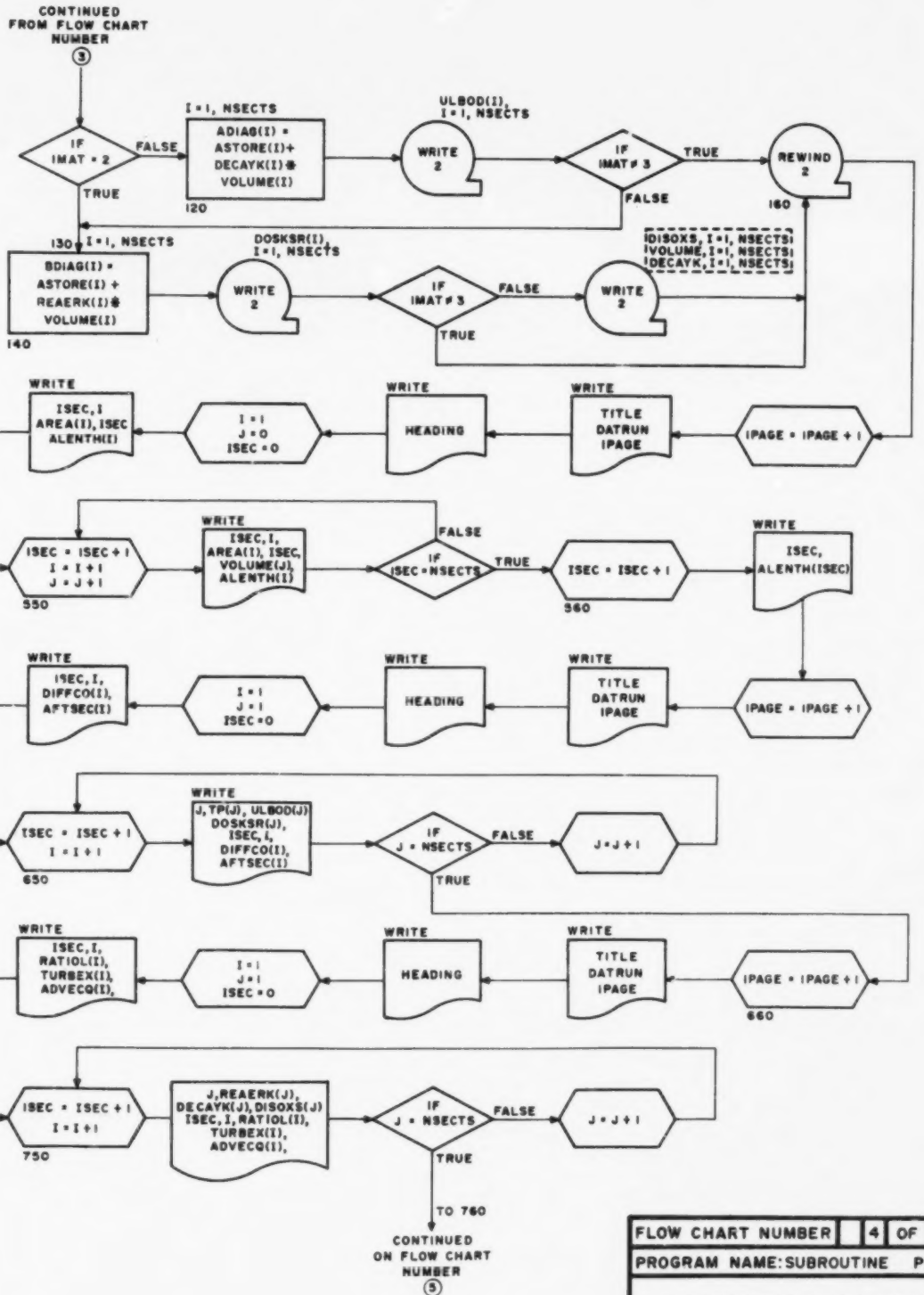
FLOW CHART NUMBER	2 OF 11
PROGRAM NAME: SUBROUTINE POLYB	

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION
CHARLOTTESVILLE, VIRGINIA



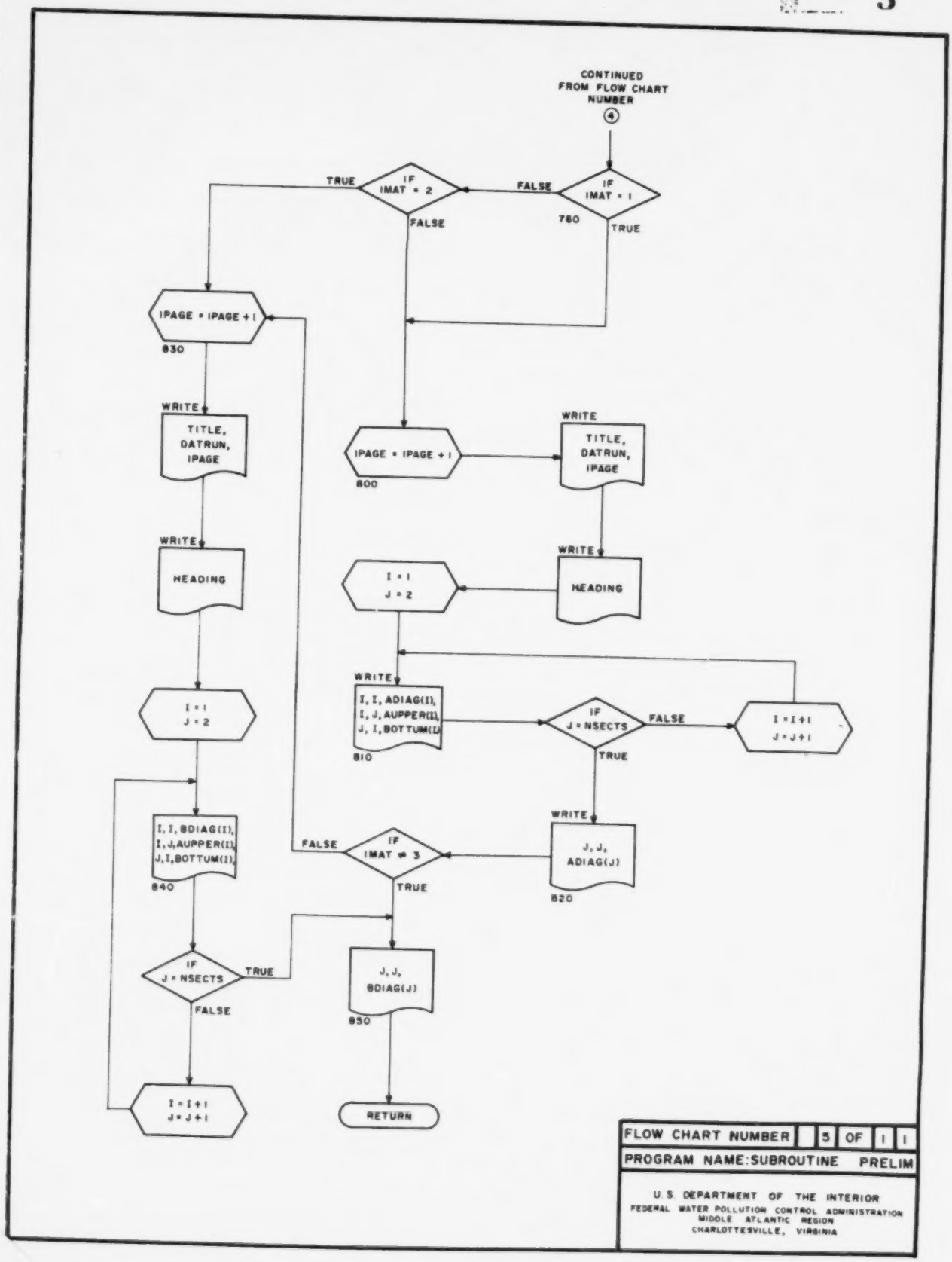
FLOW CHART NUMBER	3 OF 11
PROGRAM NAME: SUBROUTINE PRELIM	

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION
CHARLOTTESVILLE, VIRGINIA



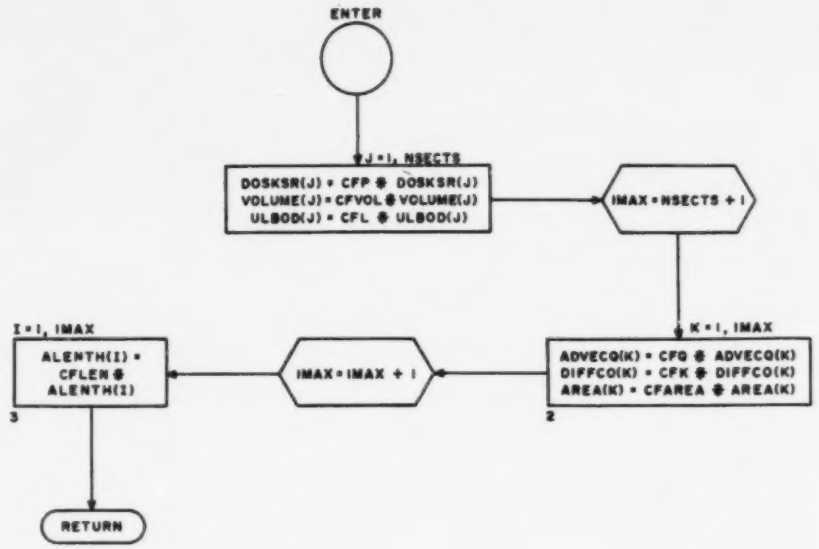
FLOW CHART NUMBER	4 OF 11
PROGRAM NAME: SUBROUTINE PRELIM	

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION
CHARLOTTESVILLE, VIRGINIA



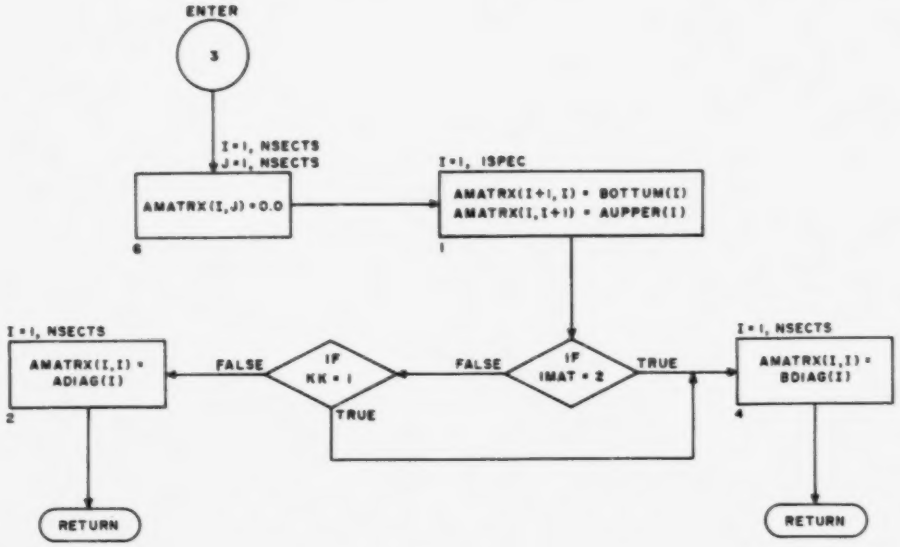
FLOW CHART NUMBER		5	OF	11
PROGRAM NAME: SUBROUTINE PRELIM				

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION
CHARLOTTESVILLE, VIRGINIA



FLOW CHART NUMBER 1 1 OF 1 1

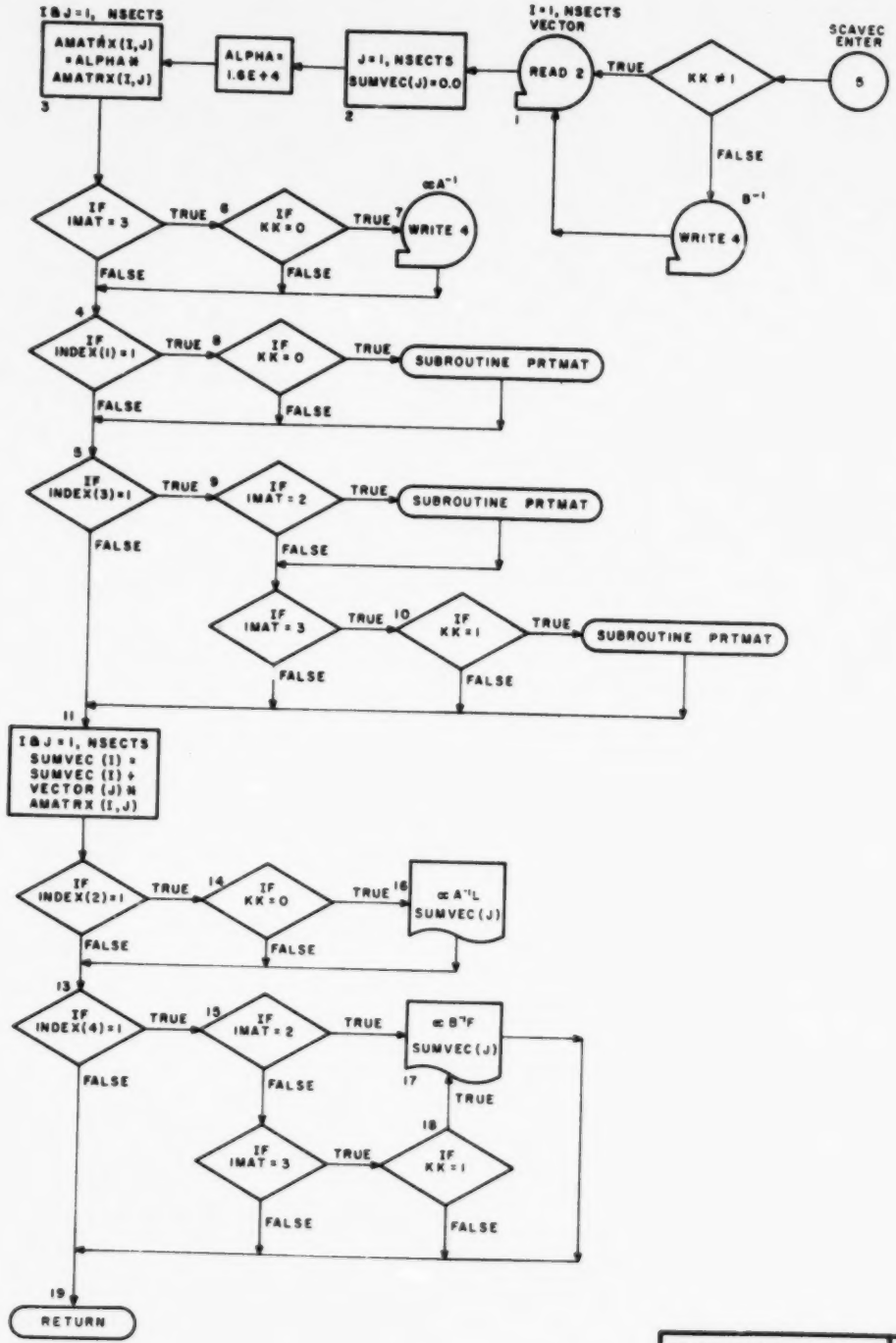
PROGRAM NAME: SUBROUTINE PRECFM



FLOW CHART NUMBER 6 OF 1 1

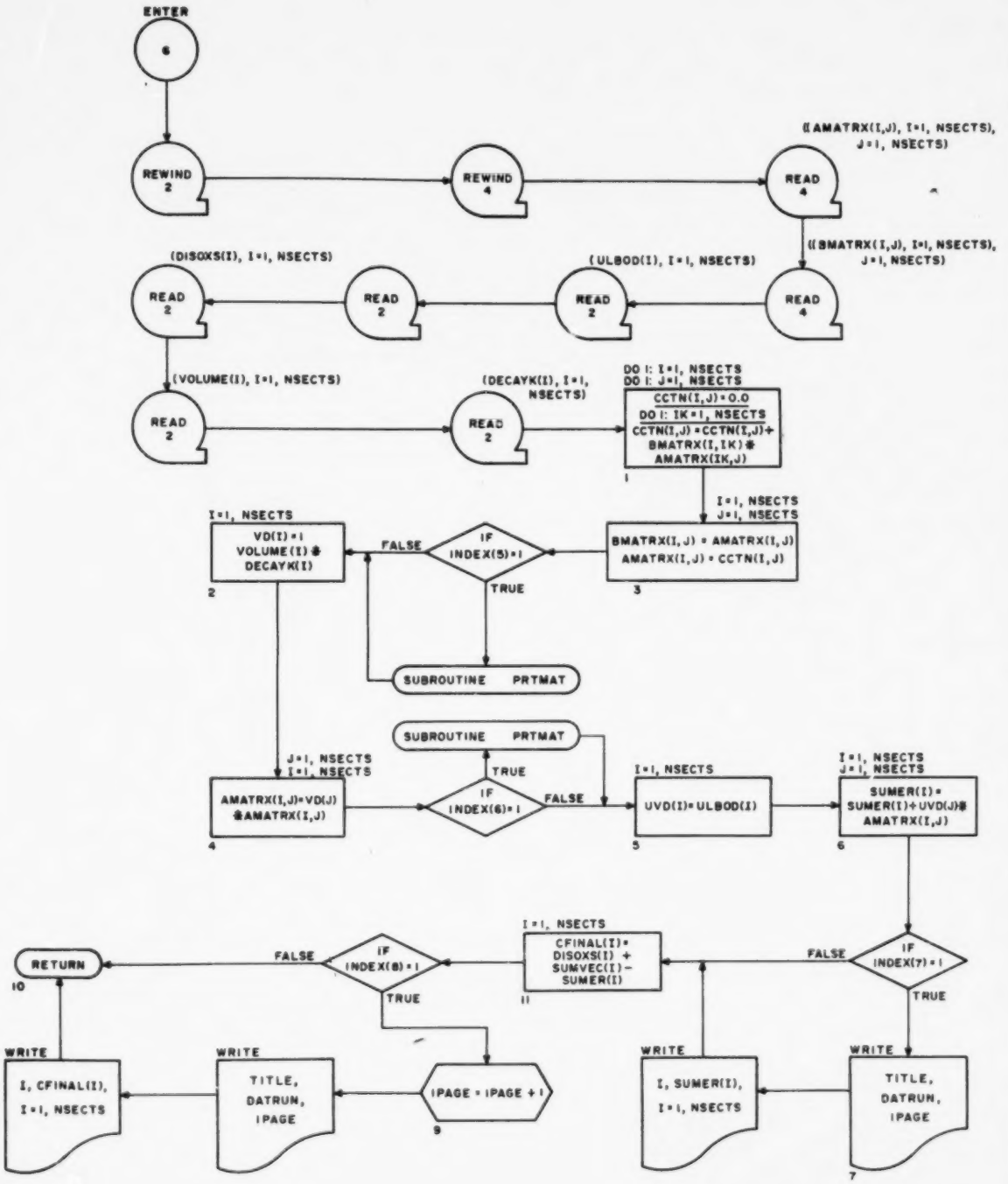
PROGRAM NAME: SUBROUTINE PRECAL

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION
CHARLOTTESVILLE, VIRGINIA



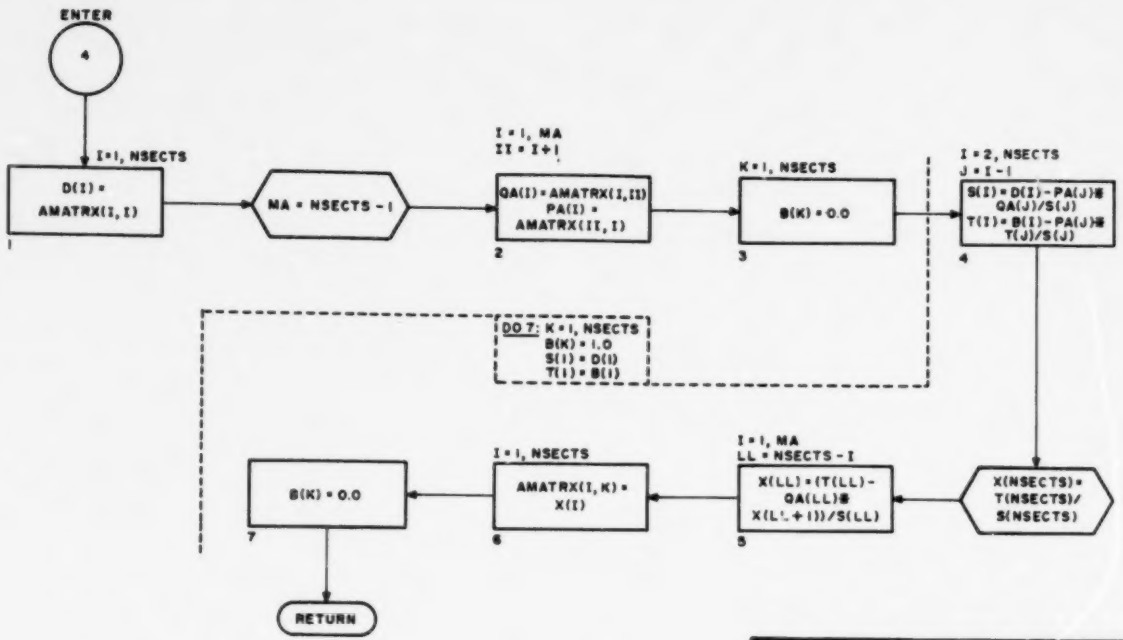
FLOW CHART NUMBER		7	OF	1	1
PROGRAM NAME: SUBROUTINE SCAVEC					

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION
CHARLOTTESVILLE, VIRGINIA



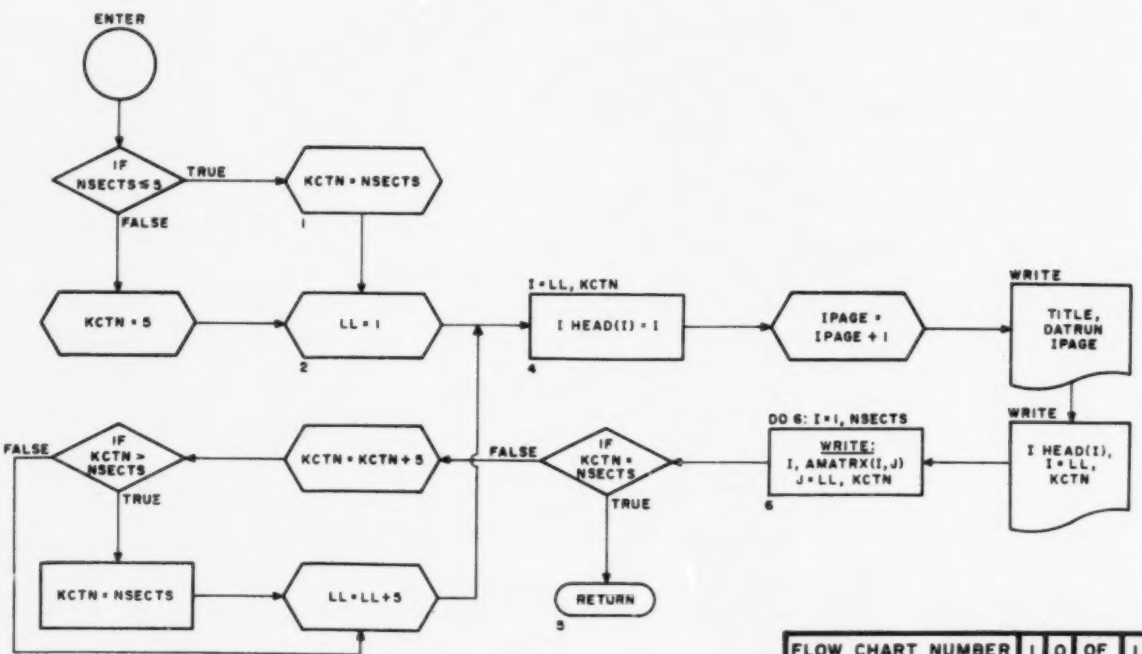
FLOW CHART NUMBER	8 OF 11
PROGRAM NAME: SUBROUTINE FINAL	

U.S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION
CHARLOTTESVILLE, VIRGINIA



FLOW CHART NUMBER	9	OF	1	1

PROGRAM NAME: SUBROUTINE INVERT



FLOW CHART NUMBER	1	0	OF	1	1

PROGRAM NAME: SUBROUTINE PRTMAT

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION
CHARLOTTESVILLE, VIRGINIA

APPENDIX II

IBM 360 VERSION I

FORTRAN PROGRAM LISTING

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                C       PROGRAM MAIN
                C       MIDDLE ATLANTIC REGION - IBM 360 VERSION I
                C       STEADY STATE SEGMENTED ESTUARY MODEL
                C       FOR FURTHER INFORMATION CONTACT
                C             PROJECT ENGINEER- DR. L.HETLING
                C             SYSTEMS ANALYST-PROGRAMMER- R.E.BUNCE
                C
                C       STORAGE ALLOCATION-MAIN PROGRAM
                C
ISN 0002                DOUBLE PRECISION DATRUN(4),USER(4),TITLE(12)
ISN 0003                COMMON/DATUSE/DATRUN,USER,IPAGE
ISN 0004                COMMON/CONTRL/TITLE,NCASES,NSECTS,IMAT,INDEX(8),KK,ISPEC,IMAX,ITP(
                       12),CFQ,CFLEN,CFK,CFL,CFAREA,CFVOL,CFP
ISN 0005                COMMON/AWORKS/KCON(3),CVAL(30),TP(40),TP1(40)
ISN 0006                COMMON/BWORKS/ABLOCK(3600),CCTN(1600)
ISN 0007                NAMELIST/CF/NSECTS,IMAT,INDEX,ITP,CFQ,CFLEN,CFK,CFL,CFAREA,CFVOL,C
                       1FP
                C
                C       CONTROL INFORMATION
                C
                C       TITLE-72ALPHANUMERIC CHARACTERS
                C       NCASES - NUMBER OF RUNS FOR PRODUCTION      CONTROL CARD 1,COL1-3
                C       DATRUN - DATE FOR THE COMPUTER RUN          CONTROL CARD 2,COL1-24
                C       USER   - NAME OF THE PROGRAM USER           CONTROL CARD 2,COL1-24
                C       TITLE  - INFORMATION FOR THE HEADING        CONTROL CARD 3,COL1-72
                C
                C       DATA INPUT-CONTROL INFORMATION AND HEADING OUTPUT DATA
                C
ISN 0008                CALL TIMEIN
ISN 0009                ICTN=1
ISN 0010                READ (5,100) NCASES
ISN 0011                READ (5,150) (DATRUN(I),I=1,4)
ISN 0012                READ (5,150) (USER(I),I=1,4)
ISN 0013              6 READ (5,200) (TITLE(I),I=1,12)
ISN 0014                WRITE (6,250)
ISN 0015                WRITE(6,300)(TITLE(I),I=1,12),(DATRUN(I),I=1,4),(USER(I),I=1,4)
ISN 0016                READ (5,CF)
                C
                C       INITIALIZE CORE
                C
ISN 0017                DO 10 J=1,3
ISN 0018             10 KCON(J)=0
ISN 0019                DO 20 J=1,30
ISN 0020             20 CVAL(J)=0.0
ISN 0021                DO 30 J=1,3600
ISN 0022             30 ABLOCK(J)=0.0
ISN 0023                KK=0
ISN 0024                IPAGE=1
ISN 0025                REWIND 2
ISN 0026                REWIND 4
ISN 0027                WRITE (6,400) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0028                WRITE (6,450) NSECTS,IMAT,INDEX(1)
ISN 0029                WRITE (6,500) INDEX(2),INDEX(3),INDEX(4)
```

```
ISN 0030            WRITE (6,550) INDEX(5),INDEX(6),INDEX(7),INDEX(8)
ISN 0031            WRITE (6,650) CFQ,CFLEN,CFK,CFL,CFAREA,CFVOL,CFP
ISN 0032            IF(ITP(2).EQ.1) CALL POLYB
ISN 0034            CALL PRELIM
ISN 0035         40 CALL PRECAL
ISN 0036            CALL INVERT
ISN 0037            CALL SCAVEC
ISN 0038            KK=KK+1
ISN 0039            IF (IMAT.EQ.3) GO TO 60
ISN 0041         50 IF (ICTN.EQ.NCASES) GO TO 80
ISN 0043            ICTN=ICTN+1
ISN 0044            GO TO 6
ISN 0045         60 IF (KK.EQ.2) GO TO 70
ISN 0047            GO TO 40
ISN 0048         70 CALL FINAL
ISN 0049            GO TO 50
ISN 0050         80 REWIND 2
ISN 0051            REWIND 4
ISN 0052        100 FORMAT (I3)
ISN 0053        150 FORMAT (4A6)
ISN 0054        200 FORMAT (12A6)
ISN 0055        250 FORMAT (1H1///////////////////44X,49(1H*)/44X,49H                MIDDLE
                   1 ALTANTIC REGION             /53X,36HSTEADY STATE SEGMENTED ESTUARY
                   2 MODEL/44X,49(1H*)///////////)
ISN 0056        300 FORMAT (1HO,15X18HPROBLEM TITLE  *  ,12A6/16X18HDATE OF RUN    *
                   1,4A6/16X8HENGINEER,7X,3H*  ,4A6)
ISN 0057        350 FORMAT (I2,I2,8I2,2I2)
ISN 0058        400 FORMAT (1H1,12A6,2X,4A6,2X5HPAGE ,I2///)
ISN 0059        450 FORMAT (1H ,26X20HPROGRAM CASE CONTROL///18X30HNUMBER OF ESTUARINE
                   1 SECTIONS= ,I2//18X34HMATRIX CASE BEING CONSIDERED=IMAT=,I2/21X23H
                   2WHERE= IMAT=1  A MATRIX/28X16HIMAT=2  B MATRIX/28X22HIMAT=3  A AND
                   3 B MATRIX//18X38HPRINTING INDEX OPTIONS   IF INDEX(N)=1/21X23HFOR
                   4THIS CASE INDEX(1)=,I2,2X,22HALPHA A MATRIX INVERSE)
ISN 0060        500 FORMAT (1H ,34X,9HINDEX(2)=,I2,2X24HALPHA A MATRIX INVERSE L/35X,9
                   1HINDEX(3)=,I2,2X,22HALPHA B MATRIX INVERSE/35X,9HINDEX(4)=,I2,2X,2
                   24HALPHA B MATRIX INVERSE F)
ISN 0061        550 FORMAT (1H ,34X,9HINDEX(5)=,I2,2X24HALPHA B A MATRIX INVERSE/35X,9
                   1HINDEX(6)=,I2,2X,70HALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I)
                   2FORMED ON MATRIX COLUMNS/35X,9HINDEX(7)=,I2,2X,31HALPHA B A MATRIX
                   3 INVERSE V D L /35X,9HINDEX(8)=,I2,2X,69HDISOXS + ALPHA B MATRIX
                   4INVERSE F - ALPHA B A MATRIX INVERSE V D L  ///)
ISN 0062        600 FORMAT (1H ,18X68HTHE CONTROL VALUE ITP ALLOWS COMPUTATION BY POLY
                   1NOMIAL APPROXIMATION/19X66HFOR THE VECTORS * REAERATION,DECAY,AND
                   2DISSOLVED OXYGEN SATURATION//35X55HIF ITP(2) IS SET EQUAL TO 1 THE
                   3POLYNOMIALS ARE EMPLOYED/35X51HIF ITP(1) IS SET EQUAL TO 1 TEMPERA
                   4TURE DATA MAY BE/35X61HENTERED IN DEGREES FAHRENHEIT FOR THE POLYN
                  5OMIAL COMPUTATIONS//35X22HFOR THIS CASE ITP(Z1)=,I2/49X,7HITP(2.=,I
                   62)
ISN 0063        650 FORMAT (1H ,////18X42HCONVERSION FACTORS USED ON INPUT VARIABLES/2
                   19X,8HCFQ    =,F6.2/29X,8HCFLEN  =,F6.2/29X,8HCFK    =,F6.2/29X,8HC
                   2FL    =, F6.2/29X,8HCFAREA =,F6.2/29X,8HCFVOL  =,F6.2/29X,8HCFP
                   3 =,F6.2//)
ISN 0064             CALL TIMED(0)
ISN 0065             STOP
ISN 0066             END
```

```
ISN 0002            SUBROUTINE POLYB
                C
                C   STORAGE ALLOCATION
                C
ISN 0003            DOUBLE PRECISION DATRUN(4),USER(4),TITLE(12)
ISN 0004            COMMON/CONTRL/TITLE,NCASES,NSECTS,IMAT,INDEX(8),KK,ISPEC,IMAX,
                   1ITP(2),BC(7)
ISN 0005            COMMON/DATUSE/DATRUN,USER,IPAGE
ISN 0006            COMMON/AWORKS/KR,KD,KC,CR(10),CD(10),CC(10),TP(40),TP1(40)
ISN 0007            COMMON/BWORKS/AMATRX(40,40),REAERK(40),ADVECQ(40),DOSKSR(40),DIFFC
                   10(40),ALENTH(40),AFTSEC(40),ADJL(40),TURBFX(40),RATIOL(40),VECTOR(
                   240),AWASTE(1000),ASTORE(40),ADIAG(40),BDIAG(40),AUPPER(40),BOTTOM(
                   340),DISOXS(40),ULBOD(40),VOLUME(40),DECAYK(40),VD(40),UVD(40),AREA
                   4(40),SUMER(40),CFINAL(40),SUMVEC(40),CCTN(1600)
ISN 0008            DIMENSION Q(40),L(40),P(40),LENGTH(40),VOL(40)
ISN 0009            REAL L,LENGTH
ISN 0010            EQUIVALENCE (Q,ADVECQ),(ULBOD,L),(DOSKSR,P),(ALENTH,LENGTH),(VOLUM
                   1E,VOL)
                C
                C   LOAD INPUT LIST
                C
ISN 0011            NAMELIST/RR/KR,KD,KC,CR,CD,CC,TP
ISN 0012            READ (5,RR)
                C
                C   COMPUTE TEMPERATURE
                C
ISN 0013            IF (ITP(1).NE.1) GO TO 7
ISN 0015            DO 6 I=1,NSECTS
ISN 0016          6 TP(I)=((5./9.)*(TP(I)-32.))
ISN 0017          7 IPAGE=IPAGE + 1
                C
                C   COMPUTE POLYNOMIALS
                C
ISN 0018            MR=KR+1
ISN 0019            MD=KD+1
ISN 0020            MC=KC+1
ISN 0021            I=1
ISN 0022         15 DO 10 J=2,MR
ISN 0023         10 REAERK(I)=REAERK(I) + CR(J) * TP(I)**(J-1)
ISN 0024            DO 20 J=2,MD
ISN 0025         20 DECAYK(I)=DECAYK(I) + CD(J) * TP(I)**(J-1)
ISN 0026            DO 30 J=2,MC
ISN 0027         30 DISOXS(I)=DISOXS(I) + CC(J) * TP(I)**(J-1)
ISN 0028            REAERK(I)= REAERK(I) + CR(1)
ISN 0029            DECAYK(I)= DECAYK(I) + CD(1)
ISN 0030            DISOXS(I)= DISOXS(I) + CC(1)
ISN 0031            IF (I.EQ.NSECTS) GO TO 40
ISN 0033            I=I+1
ISN 0034            GO TO 15
                C
                C   PREPARE OUTPUT CONTROL PAGE
                C
ISN 0035         40 WRITE (6,100) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
```

```
ISN 0036            WRITE (6,150) KR,(CR(I),I=1,MR)
ISN 0037            WRITE (6,200) KD,(CD(I),I=1,MD)
ISN 0038            WRITE (6,250) KC,(CC(I),I=1,MC)
ISN 0039            WRITE (6,300) (I,REAERK(I),DECAYK(I),DISOXS(I),TP(I),I=1,NSECTS)
ISN 0040          100 FORMAT (1H1,12A6,2X,4A6,2X5HPAGE ,I2///)
ISN 0041          150 FORMAT (1H ,18X55HPOLYNOMIAL POWER AND COEFFICIENTS FOR REAERATION
                     1 VALUES//27X3HKR=,I2,16X2HCD/(40X,E15.8))
ISN 0042          200 FORMAT (1HO,18X50HPOLYNOMIAL POWER AND COEFFICIENTS FOR DECAY VALU
                     1ES//27X3HKD=,I2,16X2HCD/(40X,E15.8))
ISN 0043          250 FORMAT (1HO,18X65HPOLYNOMIAL POWER AND COEFFICIENTS FOR DISSOLVED
                     1OXYGEN SATURATION//27X3HKC=,I2,16X2HCC/(40X,E15.8))
ISN 0044          300 FORMAT (1H ,///18X45HCOMPUTED VALUES FROM THE POLYNOMIAL EQUATIONS
                     1//18X2H I,7X10HREAERATION,12X5HDECAY,3X14HD.O.SATURATION,6X11HTEMP
                     2ERATURE/18X19H                VALUES,11X6HVALUES,11X6HVALUES,11X6HVAL
                     3UES//(18XI2,4XE13.6,4XE13.6,4XE13.6,4XE13.6))
ISN 0045            RETURN
ISN 0046            END
```

```
ISN 0002            SUBROUTINE PRELIM
                C
                C   STORAGE ALLOCATION
                C
ISN 0003            DOUBLE PRECISION DATRUN(4),USER(4),TITLE(12)
ISN 0004            COMMON/DATUSE/DATRUN,USER,IPAGE
ISN 0005            COMMON/CONTRL/TITLE,NCASES,NSECTS,IMAT,INDEX(8),KK,ISPEC,IMAX,
                   1ITP(2),BC(7)
ISN 0006            COMMON/AWORKS/KR,KD,KC,CR(10),CD(10),CC(10),TP(40),TP1(40)
ISN 0007            COMMON/BWORKS/AMATRX(40,40),REAERK(40),ADVECQ(40),DOSKSR(40),DIFFC
                   10(40),ALENTH(40),AFTSEC(40),ADJL(40),TURBEX(40),RATIOL(40),VECTOR(
                   240),AWASTE(1000),ASTORE(40),ADIAG(40),BDIAG(40),AUPPER(40),BOTTOM(
                   340),DISOXS(40),ULBOD(40),VOLUME(40),DECAYK(40),VD(40),UVD(40),AREA
                   4(40),SUMER(40),CFINAL(40),SUMVEC(40),CCTN(1600)
ISN 0008            DIMENSION Q(40),L(40),P(40),LENGTH(40),VOL(40)
ISN 0009            REAL L,LENGTH
ISN 0010            EQUIVALENCE (Q,ADVECQ),(ULBOD,L),(DOSKSR,P),(ALENTH,LENGTH),(VOLUM
                   1E,VOL)
                C
                C   NAMELIST FOR INPUT DATA
                C
ISN 0011            NAMELIST/RIVER/Q,L,P,VOL,AREA,DIFFCO,LENGTH
ISN 0012            NAMELIST/RIVTO/DISOXS,REAERK,DECAYK
ISN 0013            NAMELIST/GOGO/TP1
ISN 0014            IF (ITP(2).EQ.1) GO TO 5
ISN 0016            READ (5,GOGO)
ISN 0017            DO 4 I=1,NSECTS
ISN 0018          4 TP(I)=TP1(I)
ISN 0019          5 CONTINUE
ISN 0020            READ (5,RIVER)
ISN 0021            CALL PRECFM
ISN 0022            IF(ITP(2).EQ.1) GO TO 10
ISN 0024            READ (5,RIVTO)
ISN 0025         10 IMAX = NSECTS + 2
ISN 0026            CONST= 2.*(5280.0**2)
ISN 0027            DO 20 I=1,IMAX
ISN 0028         20 ALENTH(I)=ALENTH(I)*5280.
ISN 0029            IMAX=IMAX - 1
ISN 0030            DO 30 I=1,IMAX
ISN 0031            AFTSEC(I)=ADVECQ(I)
ISN 0032            ADVECQ(I) = 86400.*ADVECQ(I)
ISN 0033            ADJL(I)   = ALENTH(I) + ALENTH(I+1)
ISN 0034         30 TURBEX(I)=((DIFFCO(I)*(AREA(I)/ADJL(I)))*CONST)
                C
                C   PREPARATION OF THE RATIOL VALUES
                C
ISN 0035            RATIOL(1)=(1.0-0.5*TURBEX(1)/ADVECQ(1))
ISN 0036            I=2
ISN 0037         40 AKK=TURBEX(I-1)/ADVECQ(I-1)
ISN 0038            AJJ=TURBEX(I)/ADVECQ(I)
ISN 0039            AII=(ALENTH(I-1)/(ALENTH(I-1)+ALENTH(I)))
ISN 0040            IF(AKK.GE.AJJ) GO TO 70
ISN 0042            RATIOL(I)=(1.0 - (0.5*(AKK + AJJ)))
```

```
ISN 0043          50 IF(RATIOL(I).GE.AII) GO TO 60
ISN 0045             RATIOL(I)=AII
ISN 0046          60 CONTINUE
ISN 0047             IF(I.EQ.IMAX) GO TO 80
ISN 0049             I=I+1
ISN 0050             GO TO 40
ISN 0051          70 RATIOL(I)=1.0-AJJ+.01
ISN 0052             GO TO 50
ISN 0053          80 RATIOL(IMAX)=0.5
                  C
                  C      PREPARATION OF THE DIAGONAL MATRIX ELEMENTS
                  C
ISN 0054             DO 90 I=2,NSECTS
ISN 0055          90 BOTTUM(I-1)=(-1.0*((ADVECQ(I)*RATIOL(I)+TURBEX(I))))
ISN 0056             ISPEC = NSECTS - 1
ISN 0057             DO 100 I=1,ISPEC
ISN 0058         100 AUPPER(I)=(ADVECQ(I+1) *(1.0 - RATIOL(I+1)))-TURBEX(I+1)
ISN 0059             DO 110 I =1,NSECTS
ISN 0060         110 ASTORE(I)=(-1.0 *ADVECQ(I)*(1.0 -RATIOL(I))+ADVECQ(I+1)*RATIOL(I+1
                    1) + TURBEX(I) + TURBEX(I+1))
                  C
                  C      PREPARE MAIN DIAGONAL FOR A OR B OR BOTH MATRIX ELEMENTS
                  C
ISN 0061             IF(IMAT.EQ.2) GO TO 130
ISN 0063             DO 120 I=1,NSECTS
ISN 0064         120 ADIAG(I) = ASTORE(I) + DECAYK(I) * VOLUME(I)
ISN 0065             WRITE (2) (ULBOD(I),I=1,NSECTS)
ISN 0066             IF(IMAT.NE.3) GO TO 160
ISN 0068         130 DO 140 I=1,NSECTS
ISN 0069         140 BDIAG(I) = ASTORE(I) + REAERK(I) * VOLUME(I)
ISN 0070             WRITE (2) (DOSKSR(I),I=1,NSECTS)
ISN 0071             IF(IMAT.NE.3) GO TO 160
ISN 0073             WRITE (2) (DISOXS(I),I=1,NSECTS)
ISN 0074             WRITE (2) (VOLUME(I),I=1,NSECTS)
ISN 0075             WRITE (2) (DECAYK(I),I=1,NSECTS)
ISN 0076         160 CONTINUE
ISN 0077             REWIND 2
                  C
                  C      GEOMETRIC INPUT DATA-PREPARATION OUTPUT-DESIGNED AS A UNIT
                  C
ISN 0078             IPAGE=IPAGE+1
ISN 0079             WRITE (6,1) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0080             WRITE (6,500)
ISN 0081             I    =1
ISN 0082             J    =0
ISN 0083             ISEC=0
ISN 0084             WRITE (6,501) ISEC,I,AREA(I),ISEC,ALENTH(I)
ISN 0085         550 ISEC=ISEC+1
ISN 0086             I=I+1
ISN 0087             J=J+1
ISN 0088             WRITE (6,502) ISEC,I,AREA(I),ISEC,VOLUME(J),ALENTH(I)
ISN 0089             IF(ISEC.EQ.NSECTS) GO TO 560
ISN 0091             GO TO 550
ISN 0092         560 ISEC=ISEC+1
```

```
ISN 0093            WRITE (6,503) ISEC,ALENTH(ISEC)
                C
                C       HYDRAULIC-LOAD OUTPUT - DESIGNED AS UNIT
                C
ISN 0094            IPAGE=IPAGE + 1
ISN 0095            WRITE (6,1) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0096            WRITE (6,600)
ISN 0097            I=1
ISN 0098            J=1
ISN 0099            ISEC=0
ISN 0100            WRITE (6,601) ISEC,I,DIFFCO(I),AFTSEC(I)
ISN 0101          650 ISEC=ISEC+1
ISN 0102            I=I+1
ISN 0103            WRITE (6,602) J,TP(J),ULBOD(J),DOSKSR(J),ISEC,I,DIFFCO(I),AFTSEC(I
                   1)
ISN 0104            IF(J.EQ.NSECTS) GO TO 660
ISN 0106            J=J+1
ISN 0107            GO TO 650
ISN 0108          660 CONTINUE
                C
                C       COMPUTED SYSTEM PARAMETERS
                C
ISN 0109            IPAGE=IPAGE+1
ISN 0110            WRITE (6,1) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0111            WRITE (6,700)
ISN 0112            I=1
ISN 0113            J=1
ISN 0114            ISEC=0
ISN 0115            WRITE (6,701) ISEC,I,RATIOL(I),TURBEX(I),ADVECO(I)
ISN 0116          750 ISEC=ISEC+1
ISN 0117            I=I+1
ISN 0118            WRITE (6,702) J,REAERK(J),DECAYK(J),DISPXS(J),ISEC,I,RATIOL(I),TUR
                   1BEX(I),ADVECO(I)
ISN 0119            IF(J.EQ.NSECTS) GO TO 760
ISN 0121            J=J+1
ISN 0122            GO TO 750
ISN 0123          760 CONTINUE
                C
                C       MATRIX ELEMENT OUTPUT DATA
                C
                C
ISN 0124            IF(IMAT.EQ.1) GO TO 800
ISN 0126            IF(IMAT.EQ.2) GO TO 830
ISN 0128          800 IPAGE=IPAGE+1
ISN 0129            WRITE (6,1) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0130            WRITE (6,801)
ISN 0131            I=1
ISN 0132            J=2
ISN 0133          810 WRITE (6,802) I,I,ADIAG(I),I,J,AUPPER(I),J,I,BOTTOM(I)
ISN 0134            IF(J.EQ.NSECTS) GO TO 820
ISN 0136            I=I+1
ISN 0137            J=J+1
ISN 0138            GO TO 810
ISN 0139          820 WRITE (6,805)  J,J,ADIAG(J)
```

```
ISN 0140          IF(IMAT.NE.3) GO TO 850
ISN 0142      830 IPAGE=IPAGE+1
ISN 0143          WRITE (6,1) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0144          WRITE (6,803)
ISN 0145          I=1
ISN 0146          J=2
ISN 0147      840 WRITE (6,804) I,I,BDIAG(I),I,J,AUPPER(I),J,I,BOTTUM(I)
ISN 0148          IF(J.EQ.NSECTS) GO TO 850
ISN 0150          I=I+1
ISN 0151          J=J+1
ISN 0152          GO TO 840
ISN 0153      850 WRITE (6,806)  J,J,BDIAG(J)
ISN 0154        1 FORMAT (1H1,12A6,2X4A6,2X5HPAGE ,I2///)
ISN 0155      500 FORMAT (1H0,42X39HG E O M E T R I C   I N P U T   D A T A///11X89H
                 1INTERFACE                AREA              SECTION                VOLU
                 2ME                LENGTH/13X86HNUMBER                (SQ.FT)
                 3   NUMBER                (CU.FT.)                (FT.)//)
ISN 0156      501 FORMAT (1H ,10XI2,2X1H-,2XI2,11XF10.0,13XI2,34XF11.1)
ISN 0157      502 FORMAT (1H ,10XI2,2X1H-,2XI2,11XF10.0,13XI2,14XE13.6,7XF11.1)
ISN 0158      503 FORMAT (1H ,53XI2,34XF11.1)
ISN 0159      600 FORMAT (1H ,29X53HH Y D R A U L I C  A N D  L O A D  I N P U T  D
                 1A T A///1X,103HSECTION        T              J                  P
                 2            INTERFACE          K                 .  Q/1X,108HNUMBER
                 3      (DEG C)        (LBS/DAY)          (LBS/DAY)          NUMBER
                 4      (SQ.MI/DAY)        (CU.FT/SEC)//)
ISN 0160      601 FORMAT (1H ,63XI2,3H - ,I2,6XE13.6,6XE13.6)
ISN 0161      602 FORMAT (1H ,2XI2,6XF8.3,6XF13.6,6XE13.6,7XI2,3H - ,I2,6XE13.6,6XE1
                 13.6)
ISN 0162      700 FORMAT (1H ,43X49HC O M P U T E D  S Y S T E M  P A R A M E T E R
                 1S//5X7HSECTION,9X1HR,10X1HD,10X10HSATURATION,9X9HINTERFACE,13X2HXI
                 2,12X1HE,15X1HQ/5X6HNUMBER,7X6H(/DAY),6X6H(/DAY),8X10HD.O.(MG/L),10
                 3X6HNUMBER,24X12H(CU.FT./DAY),5X12H(CU.FT./DAY)///)
ISN 0163      701 FORMAT (1H ,62XI2,3H - ,I2,8XE13.6,2XE13.6,4XE13.6)
ISN 0164      702 FORMAT (1H ,6XI2,8XF7.3,5XF7.3, 9XF7.3,11XI2,3H - ,I2,8XE13.6,2XE1
                 13.6,4XE13.6)
ISN 0165      801 FORMAT (1H ,43X45HD I A G O N A L  M A T R I X  E L E M E N T S//6
                 13X8HA-MATRIX//16X22HMAIN DIAGONAL ELEMENTS,19X23HUPPER DIAGONAL EL
                 2EMENTS,18X23HLOWER DIAGONAL ELEMENTS///)
ISN 0166      802 FORMAT (1H ,14X2HA(,I2,1H,,I2,2H)=1XE15.8,16X2HA(,I2,1H,,I2,2H)=,1
                 1XE15.8,16X2HA(,I2,1H,,I2,2H)=,1XE15.8)
ISN 0167      803 FORMAT (1H ,43X45HD I A G O N A L  M A T R I X  E L E M E N T S//6
                 13X8HB-MATRIX//16X22HMAIN DIAGONAL ELEMENTS,19X23HUPPER DIAGONAL EL
                 2EMENTS,18X23HLOWER DIAGONAL ELEMENTS///)
ISN 0168      804 FORMAT (1H ,14X2HB(,I2,1H,,I2,2H)=1XE15.8,16X2HB(,I2,1H,,I2,2H)=,1
                 1XE15.8,16X2HB(,I2,1H,,I2,2H)=,1XE15.8)
ISN 0169      805 FORMAT(1H ,14X2HA(,I2,1H,,I2,2H)=1XE15.8)
ISN 0170      806 FORMAT(1H ,14X2HB(,I2,1H,,I2,2H)=1XE15.8)
ISN 0171          RETURN
ISN 0172          END
```

```
ISN 0002            SUBROUTINE PRECAL
ISN 0003            DOUBLE PRECISION DATRUN(4),USER(4),TITLE(12)
ISN 0004            COMMON/CONTRL/TITLE,NCASES,NSECTS,IMAT,INDEX(8),KK,ISPEC,IMAX,
                   1ITP(2),BC(7)
ISN 0005            COMMON/BWORKS/AMATRX(40,40),REAERX(40),ADVECC(40),DDSKSR(40),DIFFC
                   10(40),ALENTH(40),AFTSEC(40),ADJL(40),TURBEX(40),RATIOL(40),VECTOR(
                   240),AWASTE(1000),ASTORE(40),ADIAG(40),BDIAG(40),AUPPER(40),BOTTUM(
                   340),DISOXS(40),ULBOD(40),VOLUME(40),DECAYK(40),VD(40),UVD(40),AREA
                   4(40),SUMER(40),CFINAL(40),SUMVEC(40),CCTN(1600)
ISN 0006              DO 6 I=1,NSECTS
ISN 0007              DO 6 J=1,NSECTS
ISN 0008            6 AMATRX(I,J)=0.0
ISN 0009              DO 1 I=1,ISPEC
ISN 0010              AMATRX (I+1,I) = BOTTUM(I)
ISN 0011            1 AMATRX (I,I+1) = AUPPER(I)
ISN 0012              IF(IMAT.EQ.2) GO TO 3
ISN 0014              IF(KK.EQ.1) GO TO 3
ISN 0016              DO 2 I=1,NSECTS
ISN 0017            2 AMATRX(I,I)=ADIAG(I)
ISN 0018              RETURN
ISN 0019            3 DO 4 I=1,NSECTS
ISN 0020            4 AMATRX(I,I)=BDIAG(I)
ISN 0021              RETURN
ISN 0022              END
```

```
ISN 0002            SUBROUTINE SCAVEC
ISN 0003            DOUBLE PRECISION DATRUN(4),USER(4),TITLE(12)
ISN 0004            COMMON/DATUSE/DATRUN,USER,IPAGE
ISN 0005            COMMON/CONTRL/TITLE,NCASES,NSECTS,IMAT,INDEX(8),KK,ISPEC,IMAX,
                   1ITP(2),BC(7)
ISN 0006            COMMON/BWORKS/AMATRX(40,40),PEAERK(40),ADVECO(40),DOSKSR(40),DIFFS
                   1O(40),ALENTH(40),AFTSEC(40),ADJL(40),TURBEX(40),RATIOL(40),VECTOR(
                   240),AWASTE(1000),ASTORE(40),ADIAG(40),BDIAG(40),AUPPER(40),BOTTOM(
                   340),DISOXS(40),ULBOD(40),VOLUME(40),DECAYK(40),VD(40),UVD(40),AREA
                   4(40),SUMER(40),CFINAL(40),SUMVEC(40),CCTN(1600)
ISN 0007            DIMENSION Q(40),L(40),P(40),LENGTH(40),VOL(40)
ISN 0008            REAL L,LENGTH
ISN 0009            EQUIVALENCE (Q,ADVECO),(ULBOD,L),(DOSKSR,P),(ALENTH,LENGTH),(VOLUM
                   1E,VOL)
ISN 0010            IF (KK.NE.1) GO TO 1
ISN 0012            WRITE (4) ((AMATRX(I,J),I=1,NSECTS),J=1,NSECTS)
ISN 0013          1 READ (2) (VECTOR(I),I=1,NSECTS)
ISN 0014            DO 2 J=1,NSECTS
ISN 0015          2 SUMVEC(J) = 0.0
                  C
                  C     CONSTANT ALPHA TIMES MATRIX INVERSE
                  C
ISN 0016            ALPHA = 1.6E+4
ISN 0017            DO 3 I=1,NSECTS
ISN 0018            DO 3 J=1,NSECTS
ISN 0019          3 AMATRX(I,J)= ALPHA * AMATRX(I,J)
                  C
                  C     PRINTING OPTION ALPHA INVERSE
                  C
ISN 0020            IF ( IMAT.EQ.3) GO TO 6
ISN 0022          4 IF (INDEX(1).EQ.1) GO TO 8
ISN 0024          5 IF (INDEX(3).EQ.1) GO TO 9
ISN 0026            GO TO 11
ISN 0027          6 IF (KK.EQ.0) GO TO 7
ISN 0029            GO TO 4
ISN 0030          7 WRITE (4) ((AMATRX(I,J),I=1,NSECTS),J=1,NSECTS)
ISN 0031            GO TO 4
ISN 0032          8 IF ( KK.EQ.0) CALL PRTMAT
ISN 0034            GO TO 5
ISN 0035          9 IF (IMAT.EQ.2) CALL PRTMAT
ISN 0037            IF (IMAT.EQ.3) GO TO 10
ISN 0039            GO TO 11
ISN 0040         10 IF (KK.EQ.1) CALL PRTMAT
ISN 0042         11 CONTINUE
                  C
                  C     ALPHA TIMES MATRIX INVERSE TIMES VECTOR
                  C
ISN 0043            DO 12 I=1,NSECTS
ISN 0044            DO 12 J=1,NSECTS
ISN 0045         12 SUMVEC(I) = SUMVEC(I) + VECTOR(J)*AMATRX(I,J)
                  C
                  C     PRINTING OPTION ALPHA * MATRIX INVERSE * VECTOR
                  C
```

```
ISN 0046            IF (INDEX(2).EQ.1) GO TO 14
ISN 0048         13 IF (INDEX(4).EQ.1) GO TO 15
ISN 0050            GO TO 19
ISN 0051         14 IF (KK.EQ.0) GO TO 16
ISN 0053            GO TO 13
ISN 0054         15 IF (IMAT.EQ.2) GO TO 17
ISN 0056            IF (IMAT.EQ.3) GO TO 18
ISN 0058            GO TO 19
ISN 0059         16 IPAGE=IPAGE+1
ISN 0060            WRITE (6,50) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0061            WRITE (6,51)
ISN 0062            WRITE (6,53) (I,SUMVEC(I),I=1,NSECTS)
ISN 0063            GO TO 13
ISN 0064         17 IPAGE=IPAGE+1
ISN 0065            WRITE (6,50) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0066            WRITE (6,52)
ISN 0067            WRITE (6,53) (I,SUMVEC(I),I=1,NSECTS)
ISN 0068            GO TO 19
ISN 0069         18 IF (KK.EQ.1) GO TO 17
ISN 0071         19 CONTINUE
ISN 0072         50 FORMAT (1H1,12A6,2X4A6,2X5HPAGE ,I2//////////)
ISN 0073         51 FORMAT (1H ,33X,24HALPHA A MATRIX INVERSE L/////35X,1HI,6X,13HFINA
                   1L ANSWERS///)
ISN 0074         52 FORMAT (1H ,33X,24HALPHA B MATRIX INVERSE F/////35X,1HI,6X,13HFINA
                   1L ANSWERS///)
ISN 0075         53 FORMAT (1H ,33XI2,6XE15.8)
ISN 0076            RETURN
ISN 0077            END
```

```
ISN 0002            SUBROUTINE FINAL
ISN 0003            DOUBLE PRECISION DATRUN(4),USER(4),TITLE(12)
ISN 0004            COMMON/DATUSE/DATRUN,USER,IPAGE
ISN 0005            COMMON/CONTRL/TITLE,NCASES,NSECTS,IMAT,INDEX(8),KK,ISPEC,IMAX,
                   1ITP(2),BC(7)
ISN 0006            COMMON/BWORKS/AMATRX(40,40),BMATRX(40,40),DISOXS(40),ULBOD(40),VOL
                   1UME(40),DECAYK(40),VD(40),UVD(40),AREA(40),SUMER(40),CFINAL(40),SU
                   2MVEC(40),CCTN(40,40)
ISN 0007            DIMENSION L(40),VOL(40)
ISN 0008            REAL L
ISN 0009            EQUIVALENCE (ULBOD,L),(VOLUME,VOL)
ISN 0010            REWIND 2
ISN 0011            REWIND 4
                C
                C     READ IN BINARY MATRIX DATA ALPHA A-INVERSE AND
                C     B-INVERSE MATRIX, READ IN VECTORS ULBOD,DISOXS
                C     ,VOLUME AND DECAYK
                C
ISN 0012            READ (4) ((AMATRX(I,J),I=1,NSECTS),J=1,NSECTS)
ISN 0013            READ (4) ((BMATRX(I,J),I=1,NSECTS),J=1,NSECTS)
ISN 0014            READ (2) (ULBOD(I),I=1,NSECTS)
ISN 0015            READ (2)
ISN 0016            READ (2) (DISOXS(I),I=1,NSECTS)
ISN 0017            READ (2) (VOLUME(I),I=1,NSECTS)
ISN 0018            READ (2) (DECAYK(I),I=1,NSECTS)
                C
                C     COMPUTE THE PRODUCT MATRIX WHICH IS EQUAL TO THE
                C     ALPHA A INVERSE MATRIX TIMES B INVERSE MATRIX.
                C     PRINT OUT PRODUCT RESULTS ON INDEX(5) OPTION
                C
ISN 0019            DO 1 I=1,NSECTS
ISN 0020            DO 1 J=1,NSECTS
ISN 0021            CCTN(I,J)=0.0
ISN 0022            DO  1 IK=1,NSECTS
ISN 0023          1 CCTN(I,J)=CCTN(I,J)+BMATRX(I,IK)*AMATRX(IK,J)
ISN 0024            DO 3 I=1,NSECTS
ISN 0025            DO 3 J=1,NSECTS
ISN 0026            BMATRX(I,J)=AMATRX(I,J)
ISN 0027          3 AMATRX(I,J)=CCTN(I,J)
ISN 0028            IF(INDEX(5).EQ.1) CALL PRTMAT
                C
                C     COMPUTE THE VOLUME-DECAYK VECTOR PRODUCT AS VD
                C
ISN 0030            DO 2 I=1,NSECTS
ISN 0031          2 VD(I)=VOLUME(I)*DECAYK(I)
                C
                C     FORM SPECIAL MATRIX-EACH ELEMENT OF VD VECTOR
                C     IS MULTIPLIED TIMES COLUMN OF AMATRX,PRIOR TO
                C     THIS THE AMATRX IS SAVED IN BMATRX.
                C
ISN 0032            DO 4 J=1,NSECTS
ISN 0033            DO 4 I=1,NSECTS
ISN 0034          4 AMATRX(I,J)=VD(J)*AMATRX(I,J)
```

```
ISN 0035            IF(INDEX(6).EQ.1) CALL PRTMAT
                C
                C     FORM THE ULBOD VOLUME DECAY VECTOR + AREA VECTOR
                C
ISN 0037            DO 5 I=1,NSECTS
ISN 0038          5 UVD(I)=ULBOD(I)
                C
                C     FORM THE ALPHA A INVERSE B INVERSE ULBOD VOLUME DECAYK PRODUCT
                C
ISN 0039            DO 6 I=1,NSECTS
ISN 0040            DO 6 J=1,NSECTS
ISN 0041          6 SUMER(I)=SUMER(I)+UVD(J)*AMATRX(I,J)
ISN 0042            IF(INDEX(7).EQ.1) GO TO 7
ISN 0044            GO TO 8
ISN 0045          7 WRITE (6,100) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0046            WRITE (6,150) (I,SUMER(I),I=1,NSECTS)
                C
                C
                C     DISOXS + ALPHA B INVERSE F - ALPHA A B INVERSE L V D A
                C
ISN 0047          8 CONTINUE
ISN 0048            DO 11 I=1,NSECTS
ISN 0049         11 CFINAL(I)= DISOXS(I) + SUMVEC(I) - SUMER(I)
ISN 0050            IF (INDEX(8).EQ.1) GO TO 9
ISN 0052            GO TO 10
ISN 0053          9 IPAGE=IPAGE + 1
ISN 0054            WRITE (6,200) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0055            WRITE (6,250) (I,CFINAL(I),I=1,NSECTS)
ISN 0056         10 CONTINUE
ISN 0057        100 FORMAT (1H1,12A6,2X,4A6,2X5HPAGE ,I2///)
ISN 0058        150 FORMAT (1H ,///////////30X38HA L P H A  B A  I N V E R S E  V D L
                   1///35X7HSECTION,10X13HFINAL ANSWERS/35X6HNUMBER,/35X6HNUMBER///(37
                   2X,I2,12X,E13.6))
ISN 0059        200 FORMAT (1H1,12A6,2X,4A6,2X5HPAGE ,I2///)
ISN 0060        250 FORMAT (1H ,///////////20X62HD.O.SATURATION + ALPHA B INVERSE F - A
                   1LPHA B A INVERSE V D L  ///35X7HSECTION,10X13HFINAL ANSWERS/35X6HN
                   2UMBER///(37X,I2,12X,E13.6))
ISN 0061            RETURN
ISN 0062            END
```

```
ISN 0002            SUBROUTINE INVERT
ISN 0003            DOUBLE PRECISION DATRUN(4),USER(4),TITLE(12)
ISN 0004            COMMON/DATUSE/DATRUN,USER,IPAGE
ISN 0005            COMMON/CONTRL/TITLE,NCASES,NSECTS,IMAT,INDEX(3),KK,ISPEC,IMAX,
                   1ITP(2),BC(7)
ISN 0006            COMMON/BWORKS/AMATRX(40,40),AWASTE(2000)
ISN 0007            DIMENSION PA(50), D(50),QA(50),S(50),T(50),B(50),X(50)
ISN 0008            DO 1 I =1,NSECTS
ISN 0009          1 D(I) = AMATRX(I,I)
ISN 0010            MA = NSECTS - 1
ISN 0011            DO 2 I=1,MA
ISN 0012            II=I+1
ISN 0013            QA(I)=AMATRX(I,II)
ISN 0014          2 PA(I)=AMATRX(II,I)
ISN 0015            DO 3 K =1,NSECTS
ISN 0016          3 B(K)=0.0
ISN 0017            DO 7 K =1,NSECTS
ISN 0018            B(K)=1.0
ISN 0019            S(1)=D(1)
ISN 0020            T(1)=B(1)
ISN 0021            DO 4 I =2,NSECTS
ISN 0022            J=I-1
ISN 0023            S(I)=D(I)-PA(J)*QA(J)/S(J)
ISN 0024          4 T(I)=B(I)-PA(J)*T(J)/S(J)
ISN 0025            X(NSECTS) = T(NSECTS)/S(NSECTS)
ISN 0026            DO 5 I=1,MA
ISN 0027            LL = NSECTS - I
ISN 0028          5 X(LL)=(T(LL)-QA(LL)*X(LL+1))/S(LL)
ISN 0029            DO 6 I=1,NSECTS
ISN 0030          6 AMATRX(I,K)=X(I)
ISN 0031          7 B(K)=0.0
ISN 0032            RETURN
ISN 0033            END
```

```
ISN 0002            SUBROUTINE PRTMAT
ISN 0003            DOUBLE PRECISION DATRUN(4),USER(4),TITLE(12)
ISN 0004            COMMON/DATUSE/DATRUN,USER,IPAGE
ISN 0005            COMMON/CONTRL/TITLE,NCASES,NSECTS,IMAT,INDEX(8),KK,ISPEC,IMAX,
                   1ITP(2),BC(7)
ISN 0006            COMMON/BWORKS/AMATRX(40,40),AWASTE(2000)
ISN 0007            DIMENSION  IHEAD(50)
ISN 0008          50 FORMAT(1H1,12A6,2X,4A6,2X5HPAGE ,I2///)
ISN 0009          51 FORMAT (1H ,8X6HI     J,7XI2,17XI2,17XI2,17XI2,17XI2)
ISN 0010          52 FORMAT (1H ,7XI2,6XE15.8,4XE15.8,4XE15.8,4XE15.8,4XE15.8)
ISN 0011            IF (NSECTS.LE.5) GO TO 1
ISN 0013            KCTN = 5
ISN 0014            GO TO 2
ISN 0015          1 KCTN = NSECTS
ISN 0016          2 LL = 1
ISN 0017          3 DO 4 I=LL,KCTN
ISN 0018          4 IHEAD(I)=I
ISN 0019            IPAGE=IPAGE+1
ISN 0020            WRITE (6,50) (TITLE(I),I=1,12),(DATRUN(I),I=1,4),IPAGE
ISN 0021            WRITE (6,51) (IHEAD(I),I=LL,KCTN)
ISN 0022            DO 6 I=1,NSECTS
ISN 0023          6 WRITE (6,52)  I,(AMATRX(I,J),J=LL,KCTN)
ISN 0024            IF (KCTN.EQ.NSECTS)  GO TO 5
ISN 0026            KCTN = KCTN + 5
ISN 0027            IF (KCTN.GT.NSECTS)  KCTN = NSECTS
ISN 0029            LL = LL + 5
ISN 0030            GO TO 3
ISN 0031          5 CONTINUE
ISN 0032            RETURN
ISN 0033            END
```

```
ISN 0002            SUBROUTINE PRECFM
ISN 0003            DOUBLE PRECISION DATRUN(4),USER(4),TITLE(12)
ISN 0004            COMMON/CONTRL/TITLE,NCASES,NSECTS,IMAT,INDEX(8),KK,ISPEC,IMAX,
                   1ITP(2),CFQ,CFLEN,CFK,CFL,CFAREA,CFVOL,CFP
ISN 0005            COMMON/BWORKS/AA(1640),ADVECQ(40),DOSKSR(40),DIFFCO(40),ALENTH(40)
                   1,BB(480),ULBOD(40),VOLUME(40),AB(120),AREA(40),AC(1720)
ISN 0006            DIMENSION Q(40),L(40),P(40),LENGTH(40),VOL(40)
ISN 0007            REAL L,LENGTH
ISN 0008            EQUIVALENCE (Q,ADVECQ),(ULBOD,L),(DOSKSR,P),(ALENTH,LENGTH),(VOLUM
                   1E,VOL)
ISN 0009            DO 1 J=I,NSECTS
ISN 0010            DOSKSR(J)=CFP *DOSKSR(J)
ISN 0011            VOLUME(J)=CFVOL*VOLUME(J)
ISN 0012          1 ULBOD(J) =CFL*ULBOD(J)
ISN 0013            IMAX=NSECTS+1
ISN 0014            DO 2 K=I,IMAX
ISN 0015            ADVECQ(K)=CFQ*ADVECQ(K)
ISN 0016            DIFFCO(K)=CFK*DIFFCO(K)
ISN 0017          2 AREA(K)=CFAREA*AREA(K)
ISN 0018            IMAX=IMAX+1
ISN 0019            DO 3 I=1,IMAX
ISN 0020          3 ALENTH(I)=CFLEN*ALENTH(I)
ISN 0021            RETURN
ISN 0022            END
```

APPENDIX III

SAMPLE INPUTS

```
  2
 11/1/67
NAME OF THE PROGRAM USER   RONALD BUNCE
NAME OF THE ESTUARY BEING INVESTIGATED
 $CF
 NSECTS=14,
 IMAT=3,
 INDEX=8*1,
 ITP=2*0,
 CFC=1.,
 CFLEN=1.,
 CFK=1.,
 CFL=1.,
 CFAREA=1.,
 CFVOL=1.,
 CFP=1.,
 $END
 $GOGO
 TP1=6*28.0,4*29.0,4*30.0,
 $END
 $RIVER
 C=2471,2471,13*2500,
 L=63000,81600,3*0.0,672,22500,7*0.0,
 P=-950,-450,-550,-570,-640,-685,-695,7*-700,
 VOL=19E6,4*70E6,64E6,74E6,69E6,64E6,67E6,75E6,3*76E6,
 AREA=13E3,4*13250,12100,14000,13050,12100,12680,14200,4*14400,
 DIFFCO=0.0,0.12,0.14,0.15,0.16,0.16,0.17,0.18,0.19,0.20,2*0.21,3*0.23,
 LENGTH=0.3,15*1.0,
 $END
 $RIVIO
 DISOXS=6*7.92,3*7.77,5*7.63,
 REAERK=14*0.19,
 DECAYK=6*0.46,3*0.49,5*0.52,
 $END
```

```
CASE NUMBER 2 NAME OF ESTUARY BEING INVESTIGATED
 $CF
 NSECTS=14,
 IMAT=3,
 INDEX=8*1,
 ITP=2*0,
 CFC=1.,
 CFLEN=1.,
 CFK=1.,
 CFL=1.,
 CFAREA=1.,
 CFVOL=1.,
 CFP=1.,
 $END
 $GOGC
 TP1=6*28.0,4*29.0,4*30.0,
 $END
 $RIVER
 C=1245,1245,13*1300,
 L=63000,81600,3*0.0,672,14200,7*0.0,
 P=-990,-450,-550,-570,-640,-685,-695,7*-700,
 VOL=1956,4*70E6,64E6,74E6,69E6,64E6,67E6,75E6,3*76E6,
 AREA=13E3,4*13250,12100,14000,13050,12100,12680,14200,4*14400,
 DIFFCO=0.0,0.12,0.14,0.15,0.16,0.16,0.17,0.18,0.19,0.20,2*0.21,3*0.23,
 LENGTH=0.3,15*1.0,
 $END
 $RIVTO
 DISOXS=6*7.92,3*7.77,5*7.63,
 REAERK=14*0.04,
 DECAYK=6*0.46,3*0.49,5*0.52,
 $END
```

A P P E N D I X IV

TYPICAL PROGRAM CASE SOLUTIONS

SECTION A - SAMPLE INPUT & OUTPUT

$\propto A^{-1}$

IMAT = 1

INDEX(1) = 1

CONVERSION FACTORS USED ON INPUT VARIABLES

CFQ	=	1.00
CFLEN	=	1.00
CFK	=	1.00
CFL	=	1.00
CFAREA	=	1.00
CFVOL	=	1.00
CFP	=	1.00

****
MIDDLE ATLANTIC REGION
STEADY STATE SEGMENTED ESTUARY MODEL
****

PROBLEM TITLE * STEADY STATE TEST CASE 1
DATE OF RUN * 9/20/67
ENGINEER * R.E.BUNCE

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 1
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 1 ALPHA A MATRIX INVERSE
INDEX(2)= 0 ALPHA A MATRIX INVERSE L
INDEX(3)= 0 ALPHA B MATRIX INVERSE
INDEX(4)= 0 ALPHA B MATRIX INVERSE F
INDEX(5)= 0 ALPHA B A MATRIX INVERSE
INDEX(6)= 0 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 0 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 0 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11880.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
				0 - 1	0.0	0.500000E 03
1	20.000	0.0	0.0	1 - 2	0.500000E-01	0.500000E 03
2	20.000	0.0	-0.700000E 03	2 - 3	0.100000E 00	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	3 - 4	0.150000E 00	0.502000E 03
4	20.000	0.0	-0.248000E 05	4 - 5	0.200000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	5 - 6	0.250000E 00	0.528000E 03
6	20.000	0.457200E 04	-0.372000E 05	6 - 7	0.350000E 00	0.864000E 03
7	20.000	0.0	-0.604000E 05	7 - 8	0.450000E 00	0.903000E 03
8	20.000	0.0	-0.380000E 05	8 - 9	0.550000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	9 - 10	0.650000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	10 - 11	0.750000E 00	0.907000E 03
11	20.000	0.230000E 02	-0.303000E 05	11 - 12	0.900000E 00	0.910000E 03
12	20.000	0.0	-0.682000E 05	12 - 13	0.120000E 01	0.913000E 03
13	20.000	0.0	-0.321000E 05	13 - 14	0.150000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	14 - 15	0.195000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	15 - 16	0.280000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	16 - 17	0.390000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	17 - 18	0.530000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	18 - 19	0.600000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	19 - 20	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	20 - 21	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	F (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331391E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.746496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479984E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

A-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
A(1, 1)=	0.82356864E 08	A(1, 2)=	-0.16569040E 07	A(2, 1)=	-0.44856880E 08
A(2, 2)=	0.82541184E 08	A(2, 3)=	-0.16843470E 07	A(3, 2)=	-0.44884320E 08
A(3, 3)=	0.98695408E 08	A(3, 4)=	-0.41383280E 07	A(4, 3)=	-0.47511120E 08
A(4, 4)=	0.11169682E 09	A(4, 5)=	-0.41857280E 07	A(5, 4)=	-0.47558512E 08
A(5, 5)=	0.11776109E 09	A(5, 6)=	-0.45620800E 06	A(6, 5)=	-0.46075392E 08
A(6, 6)=	0.15417074E 09	A(6, 7)=	-0.10649600E 07	A(7, 6)=	-0.75714544E 08
A(7, 7)=	0.20001643E 09	A(7, 8)=	-0.69323200E 07	A(8, 7)=	-0.84951504E 08
A(8, 8)=	0.20277424E 09	A(8, 9)=	-0.18822752E 08	A(9, 8)=	-0.96841936E 08
A(9, 9)=	0.26419011E 09	A(9,10)=	-0.48848224E 08	A(10, 9)=	-0.12686741E 09
A(10,10)=	0.31100186E 09	A(10,11)=	-0.86289104E 08	A(11,10)=	-0.16465389E 09
A(11,11)=	0.39201152E 09	A(11,12)=	-0.89098464E 08	A(12,11)=	-0.16772245E 09
A(12,12)=	0.69926784E 09	A(12,13)=	-0.15328653E 09	A(13,12)=	-0.23216971E 09
A(13,13)=	0.80363571E 09	A(13,14)=	-0.31646618E 09	A(14,13)=	-0.39534925E 09
A(14,14)=	0.12109588E 10	A(14,15)=	-0.44060954E 09	A(15,14)=	-0.51949286E 09
A(15,15)=	0.13651917E 10	A(15,16)=	-0.35069901E 09	A(16,15)=	-0.42958234E 09
A(16,16)=	0.21093960E 10	A(16,17)=	-0.10123144E 10	A(17,16)=	-0.10911977E 10
A(17,17)=	0.32019016E 10	A(17,18)=	-0.13307044E 10	A(18,17)=	-0.14095875E 10
A(18,18)=	0.37194258E 10	A(18,19)=	-0.15073385E 10	A(19,18)=	-0.15862218E 10
A(19,19)=	0.36371612E 10	A(19,20)=	-0.11209403E 10	A(20,19)=	-0.11998234E 10
A(20,20)=	0.32107914E 10	A(20,21)=	-0.12234683E 10	A(21,20)=	-0.13023516E 10
A(21,21)=	0.34772705E 10				
B(21,21)=	0.0				

I	J	1	2	3	4	5
1		0.19644471E-03	0.39809856E-05	0.69193050E-07	0.26030185E-08	0.92629779E-10
2		0.10777620E-03	0.19787614E-03	0.34392615E-05	0.12938375E-06	0.46041890E-08
3		0.49918046E-04	0.91649155E-04	0.16669781E-03	0.62711115E-05	0.22316078E-06
4		0.21559681E-04	0.39583421E-04	0.71997129E-04	0.14815708E-03	0.52722480E-05
5		0.87171229E-05	0.16004575E-04	0.2911024RE-04	0.59903687E-04	0.13815780E-03
6		0.26121306E-05	0.47958501E-05	0.87230237E-05	0.17950428E-04	0.41399719E-04
7		0.10039403E-05	0.18432283E-05	0.33525921E-05	0.68990321E-05	0.15911472E-04
8		0.43686208E-06	0.80207593E-06	0.14588713E-05	0.30020974E-05	0.69238331E-05
9		0.17522098E-06	0.32170419E-06	0.58513791E-06	0.12041100E-05	0.27770802E-05
10		0.81580481E-07	0.14978110E-06	0.27243181E-06	0.56061708E-06	0.12929704E-05
11		0.36410608E-07	0.66849566E-07	0.12159057E-06	0.25021183E-06	0.57707234E-06
12		0.94371266E-08	0.17326499E-07	0.31514624E-07	0.64851463E-07	0.14956919E-06
13		0.32110234E-08	0.58954086E-08	0.10722982E-07	0.22065986E-07	0.50891568E-07
14		0.12307055E-08	0.22595656E-08	0.41098538E-08	0.84573450E-08	0.19505478E-07
15		0.50125726E-09	0.92030361E-09	0.16739126E-08	0.34446144E-08	0.79444362E-08
16		0.12822847E-09	0.23542635E-09	0.42820969E-09	0.88117980E-09	0.20322961E-08
17		0.54482502E-10	0.10002936E-09	0.18194034E-09	0.37440073E-09	0.86349439E-09
18		0.25944885E-10	0.47634563E-10	0.86641028E-10	0.17829162E-09	0.41120085E-09
19		0.13070873E-10	0.23997998E-10	0.43649265E-10	0.89822888E-10	0.20716046E-09
20		0.56975024E-11	0.10460552E-10	0.19026405E-10	0.39152931E-10	0.90299782E-10
21		0.21339007E-11	0.39178183E-11	0.71260133E-11	0.14664048E-10	0.33820238E-10

I	J	6	7	8	9	10
1		0.27483105E-12	0.14857055E-14	0.52756640E-16	0.41128065E-17	0.73728810E-18
2		0.13660557E-10	0.73847395E-13	0.26222840E-14	0.20442823E-15	0.36647132E-16
3		0.66211459E-09	0.35793165E-11	0.12709967E-12	0.99084491E-14	0.17762529E-14
4		0.15642680E-07	0.84562607E-10	0.30027716E-11	0.23409047E-12	0.41964563E-13
5		0.40991227E-06	0.22159392E-08	0.78686779E-10	0.61342728E-11	0.10996690E-11
6		0.10418006E-03	0.56318589E-06	0.19998417E-07	0.15590385E-08	0.27948310E-09
7		0.40040381E-04	0.81434730E-04	0.28917020E-05	0.22543151E-06	0.40412296E-07
8		0.17423459E-04	0.35436125E-04	0.83215127E-04	0.64872902E-05	0.11629527E-05
9		0.69883654E-05	0.14213060E-04	0.33376753E-04	0.68869034E-04	0.12345907E-04
10		0.32536891E-05	0.66174016E-05	0.15539757E-04	0.32064505E-04	0.64465887E-04
11		0.14521711E-05	0.29534467E-05	0.69356320E-05	0.14310881E-04	0.28772134E-04
12		0.37638290E-06	0.76549298E-06	0.17976190E-05	0.37091841E-05	0.74573445E-05
13		0.12806584E-06	0.26046206E-06	0.61164781E-06	0.12620649E-05	0.25373911E-05
14		0.49084470E-07	0.99828696E-07	0.23442936E-06	0.48371840E-06	0.97251996E-06
15		0.19991742E-07	0.40659501E-07	0.95481369E-07	0.19701497E-06	0.39610023E-06
16		0.51141598E-08	0.10401248E-07	0.24425447E-07	0.50399098E-07	0.10132783E-06
17		0.21729336E-08	0.44193449E-08	0.10378031E-07	0.21413868E-07	0.43052783E-07
18		0.10347634E-08	0.21045179E-08	0.49420770E-08	0.10197414E-07	0.20501986E-07
19		0.52130789E-09	0.10602439E-08	0.24897895E-08	0.51373945E-08	0.10328783E-07
20		0.22723440E-09	0.46215276E-09	0.10852819E-08	0.22393554E-08	0.45022404E-08
21		0.85106672E-10	0.17309129E-09	0.40647374E-09	0.83871221E-09	0.16862369E-08

I	J	11	12	13	14	15
1		0.17244999E-18	0.23743980E-19	0.53340322E-20	0.16364856E-20	0.56532019E-21
2		0.85716748E-17	0.11802006E-17	0.26512974E-18	0.81341995E-19	0.28099400E-19
3		0.41546119E-15	0.57203258E-16	0.12850599E-16	0.39425719E-17	0.13619521E-17
4		0.98154076E-14	0.13514468E-14	0.30359969E-15	0.93144613E-16	0.32176571E-16
5		0.25721000E-12	0.35414275E-13	0.79557468E-14	0.24408279E-14	0.84317789E-15
6		0.65370445E-10	0.90006154E-11	0.20219694E-11	0.62034172E-12	0.21429538E-12
7		0.94523394E-08	0.13014581E-08	0.29236968E-09	0.89699234E-10	0.30986352E-10
8		0.27201196E-06	0.37452345E-07	0.84135863E-08	0.25812963E-08	0.89170094E-09
9		0.28876793E-05	0.39759391E-06	0.89318576E-07	0.27403036E-07	0.94662909E-08
10		0.15078424E-04	0.20760936E-05	0.46638957E-06	0.14308887E-06	0.49429570E-07
11		0.50099741E-04	0.68980553E-05	0.15496316E-05	0.47542881E-06	0.16423530E-06
12		0.12985171E-04	0.26513138E-04	0.59561135E-05	0.18273422E-05	0.63124924E-06
13		0.44182570E-05	0.90212061E-05	0.25475238E-04	0.78158346E-05	0.26999523E-05
14		0.16934091E-05	0.34576060E-05	0.97640323E-05	0.18506966E-04	0.63931684E-05
15		0.68971315E-06	0.14082561E-05	0.39768183E-05	0.75377566E-05	0.15148203E-04
16		0.17643799E-06	0.36025136E-06	0.10173244E-05	0.19287606E-05	0.38751186E-05
17		0.74965953E-07	0.15306574E-06	0.43224685E-06	0.81929107E-06	0.16464828E-05
18		0.35699234E-07	0.72890771E-07	0.20583849E-06	0.39015123E-06	0.78406458E-06
19		0.17985069E-07	0.36721943E-07	0.10370019E-06	0.19655590E-06	0.39500691E-06
20		0.78395637E-08	0.16006847E-07	0.45202174E-07	0.85677300E-07	0.17218093E-06
21		0.29361737E-08	0.59950871E-08	0.16929693E-07	0.32088955E-07	0.64487324E-07

I	J	16	17	18	19	20
1		0.11806067E-21	0.46536091E-22	0.20920629E-22	0.10015538E-22	0.40786496E-23
2		0.58682390E-20	0.23130900E-20	0.10998660E-20	0.49782500E-21	0.20273152E-21
3		0.28442812E-18	0.11211332E-18	0.50401355E-19	0.24129120E-19	0.98262110E-20
4		0.67197109E-17	0.26487150E-17	0.11907488E-17	0.57005871E-18	0.23214752E-18
5		0.17608813E-15	0.69408818E-16	0.31203225E-16	0.14938220E-16	0.60833633E-17
6		0.44753182E-13	0.17640400E-13	0.79303663E-14	0.37965812E-14	0.15460998E-14
7		0.64711552E-11	0.25507400E-11	0.11467025E-11	0.54897260E-12	0.22356075E-12
8		0.18622186E-09	0.73403186E-10	0.32998909E-10	0.15797905E-10	0.64334588E-11
9		0.19769306E-08	0.77924822E-09	0.35031622E-09	0.16771046E-09	0.68297574E-10
10		0.10322822E-07	0.40689514E-08	0.18292259E-08	0.87572372E-09	0.35662540E-09
11		0.34298729E-07	0.13519553E-07	0.60778085E-08	0.29096914E-08	0.11849279E-08
12		0.13182944E-06	0.51963323E-07	0.23360464E-07	0.11183591E-07	0.45543516E-08
13		0.56385562E-06	0.22225538E-06	0.99916406E-07	0.47834000E-07	0.19479678E-07
14		0.13351426E-05	0.52627433E-06	0.23659027E-06	0.11326523E-06	0.46125589E-07
15		0.31635363E-05	0.12469727E-05	0.56058553E-06	0.26837461E-06	0.10929153E-06
16		0.10337174E-04	0.40746108E-05	0.18317696E-05	0.87694139E-06	0.35712117E-06
17		0.43921236E-05	0.79612546E-05	0.35790363E-05	0.17134280E-05	0.69776803E-06
18		0.20915541E-05	0.37911959E-05	0.7109693BE-05	0.34036957E-05	0.13861045E-05
19		0.10537115E-05	0.19099834E-05	0.35818221E-05	0.67964620E-05	0.27677579E-05
20		0.45930545E-06	0.83254866E-06	0.15612914E-05	0.29625317E-05	0.70192100E-05
21		0.17202501E-06	0.31181679E-06	0.58475422E-06	0.11095644E-05	0.26289244E-05

I	J 21
1	0.14350705E-23
2	0.71330621E-22
3	0.34573274E-20
4	0.81680570E-19
5	0.21404159E-17
6	0.54399124E-15
7	0.78659193E-13
8	0.22635921E-11
9	0.24030278E-10
10	0.12547753E-09
11	0.41691339E-09
12	0.16024342E-08
13	0.68538633E-08
14	0.16229141E-07
15	0.38453919E-07
16	0.12565204E-06
17	0.24550758E-06
18	0.48769675E-06
19	0.97382781E-06
20	0.24696892E-05
21	0.55262881E-05

SECTION B - SAMPLE INPUT & OUTPUT

αLA^{-1}

IMAT = 1

INDEX(2) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 1
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 0 ALPHA A MATRIX INVERSE
INDEX(2)= 1 ALPHA A MATRIX INVERSE L
INDEX(3)= 0 ALPHA B MATRIX INVERSE
INDEX(4)= 0 ALPHA B MATRIX INVERSE F
INDEX(5)= 0 ALPHA B A MATRIX INVERSE
INDEX(6)= 0 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 0 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 0 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFP = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10976.8
11 - 12	84900.	11	0.920000E 09	11480.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
				0 - 1	0.0	0.500000E 03
1	20.000	0.0	0.0	1 - 2	0.500000E-01	0.500000E 03
2	20.000	0.0	-0.700000E 03	2 - 3	0.100000E 00	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	3 - 4	0.150000E 00	0.502000E 03
4	20.000	0.0	-0.248000E 05	4 - 5	0.200000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	5 - 6	0.250000E 00	0.528000E 03
6	20.000	0.457200E 04	-0.372000E 05	6 - 7	0.350000E 00	0.864000E 03
7	20.000	0.0	-0.604000E 05	7 - 8	0.450000E 00	0.903000E 03
8	20.000	0.0	-0.380000E 05	8 - 9	0.550000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	9 - 10	0.650000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	10 - 11	0.750000E 00	0.907000E 03
11	20.000	0.230000E 02	-0.303000E 05	11 - 12	0.900000E 00	0.910000E 03
12	20.000	0.0	-0.682000E 05	12 - 13	0.120000E 01	0.913000E 03
13	20.000	0.0	-0.321000E 05	13 - 14	0.150000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	14 - 15	0.195000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	15 - 16	0.280000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	16 - 17	0.390000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	17 - 18	0.530000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	18 - 19	0.600000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	19 - 20	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	20 - 21	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	F (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.746496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479984E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

A-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
A(1, 1)=	0.82356864E 08	A(1, 2)=	-0.16569040E 07		
A(2, 2)=	0.82541184E 08	A(2, 3)=	-0.16843470E 07	A(2, 1)=	-0.44856880E 08
A(3, 3)=	0.98695408E 08	A(3, 4)=	-0.41383280E 07	A(3, 2)=	-0.44884320E 08
A(4, 4)=	0.11169682E 09	A(4, 5)=	-0.41857280E 07	A(4, 3)=	-0.47511120E 08
A(5, 5)=	0.11776109E 09	A(5, 6)=	-0.45620800E 06	A(5, 4)=	-0.47558512E 08
A(6, 6)=	0.15417074E 09	A(6, 7)=	-0.10649600E 07	A(6, 5)=	-0.46075392E 08
A(7, 7)=	0.20001643E 09	A(7, 8)=	-0.69323200E 07	A(7, 6)=	-0.75714544E 08
A(8, 8)=	0.20277424E 09	A(8, 9)=	-0.18822752E 08	A(8, 7)=	-0.84951504E 08
A(9, 9)=	0.26419011E 09	A(9,10)=	-0.48848224E 08	A(9, 8)=	-0.96841936E 08
A(10,10)=	0.31100186E 09	A(10,11)=	-0.86289104E 08	A(10, 9)=	-0.12686741E 09
A(11,11)=	0.39201152E 09	A(11,12)=	-0.89098464E 08	A(11,10)=	-0.16665389E 09
A(12,12)=	0.69926784E 09	A(12,13)=	-0.15328653E 09	A(12,11)=	-0.16772249E 09
A(13,13)=	0.80363571E 09	A(13,14)=	-0.31646618E 09	A(13,12)=	-0.23216971E 09
A(14,14)=	0.12109588E 10	A(14,15)=	-0.44060954E 09	A(14,13)=	-0.39534925E 09
A(15,15)=	0.13651917E 10	A(15,16)=	-0.35069901E 09	A(15,14)=	-0.51949286E 09
A(16,16)=	0.21093960E 10	A(16,17)=	-0.10123144E 10	A(16,15)=	-0.42958234E 09
A(17,17)=	0.32019016E 10	A(17,18)=	-0.13307044E 10	A(17,16)=	-0.10911977E 10
A(18,18)=	0.37194258E 10	A(18,19)=	-0.15073385E 10	A(18,17)=	-0.14095875E 10
A(19,19)=	0.36371612E 10	A(19,20)=	-0.11209403E 10	A(19,18)=	-0.15862218E 10
A(20,20)=	0.32107914E 10	A(20,21)=	-0.12234683E 10	A(20,19)=	-0.11998234E 10
A(21,21)=	0.34772705E 10			A(21,20)=	-0.13023516E 10
B(21,21)=	0.0				

ALPHA A MATRIX INVERSE L

I	FINAL ANSWERS
1	0.45443794E-05
2	0.22587976E-03
3	0.10948177E-01
4	0.11211649E-01
5	0.17491460E 00
6	0.52816373E 00
7	0.20301640E 00
8	0.88995576E-01
9	0.42475488E-01
10	0.28723411E-01
11	0.13817206E-01
12	0.35812324E-02
13	0.12185287E-02
14	0.46703196E-03
15	0.19021875E-03
16	0.48660499E-04
17	0.20675172E-04
18	0.98456394E-05
19	0.49601749E-05
20	0.21621026E-05
21	0.80977918E-06

SECTION C - SAMPLE INPUT & OUTPUT

αA^{-1} and αLA^{-1}

IMAT = 1

INDEX(1) and INDEX(2) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 1
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 1 ALPHA A MATRIX INVERSE
INDEX(2)= 1 ALPHA A MATRIX INVERSE L
INDEX(3)= 0 ALPHA B MATRIX INVERSE
INDEX(4)= 0 ALPHA B MATRIX INVERSE F
INDEX(5)= 0 ALPHA B A MATRIX INVERSE
INDEX(6)= 0 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 0 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 0 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFP = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11880.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
				0 - 1	0.0	0.500000E 03
1	20.000	0.0	0.0	1 - 2	0.500000E-01	0.500000E 03
2	20.000	0.0	-0.700000E 03	2 - 3	0.100000E 00	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	3 - 4	0.150000E 00	0.502000E 03
4	20.000	0.0	-0.248000E 05	4 - 5	0.200000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	5 - 6	0.250000E 00	0.528000E 03
6	20.000	0.457200E 04	-0.372000E 05	6 - 7	0.350000E 00	0.864000E 03
7	20.000	0.0	-0.604000E 05	7 - 8	0.450000E 00	0.903000E 03
8	20.000	0.0	-0.380000E 05	8 - 9	0.550000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	9 - 10	0.650000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	10 - 11	0.750000E 00	0.907000E 03
11	20.000	0.230000E 02	-0.303000E 05	11 - 12	0.900000E 00	0.910000E 03
12	20.000	0.0	-0.682000E 05	12 - 13	0.120000E 01	0.913000E 03
13	20.000	0.0	-0.321000E 05	13 - 14	0.150000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	14 - 15	0.195000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	15 - 16	0.280000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	16 - 17	0.390000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	17 - 18	0.530000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	18 - 19	0.600000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	19 - 20	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	20 - 21	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	E (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149959E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.744496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479994E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

A-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
A(1, 1)=	0.82356864E 08	A(1, 2)=	-0.16569040E 07		
A(2, 2)=	0.82541184E 08	A(2, 3)=	-0.16343470E 07	A(2, 1)=	-0.44856880E 08
A(3, 3)=	0.98695408E 08	A(3, 4)=	-0.41383280E 07	A(3, 2)=	-0.44984320E 08
A(4, 4)=	0.11169682E 09	A(4, 5)=	-0.41857280E 07	A(4, 3)=	-0.47511120E 08
A(5, 5)=	0.11776109E 09	A(5, 6)=	-0.45620800E 06	A(5, 4)=	-0.47558512E 08
A(6, 6)=	0.15417074E 09	A(6, 7)=	-0.10649600E 07	A(6, 5)=	-0.46075392E 08
A(7, 7)=	0.20001643E 09	A(7, 8)=	-0.69323200E 07	A(7, 6)=	-0.75714544E 08
A(8, 8)=	0.20277424E 09	A(8, 9)=	-0.18822752E 08	A(8, 7)=	-0.84951504E 08
A(9, 9)=	0.26419011E 09	A(9,10)=	-0.48848224E 08	A(9, 8)=	-0.94841936E 08
A(10,10)=	0.31100186E 09	A(10,11)=	-0.86289104E 08	A(10, 9)=	-0.12484741E 09
A(11,11)=	0.39201152E 09	A(11,12)=	-0.89098464E 08	A(11,10)=	-0.14465389E 09
A(12,12)=	0.69926784E 09	A(12,13)=	-0.15328653E 09	A(12,11)=	-0.16772245E 09
A(13,13)=	0.80363571E 09	A(13,14)=	-0.31646618E 09	A(13,12)=	-0.23214371E 09
A(14,14)=	0.12109588E 10	A(14,15)=	-0.44060954E 09	A(14,13)=	-0.39534925E 09
A(15,15)=	0.13651917E 10	A(15,16)=	-0.35069901E 09	A(15,14)=	-0.51949286E 09
A(16,16)=	0.21093960E 10	A(16,17)=	-0.10123144E 10	A(16,15)=	-0.42958234E 09
A(17,17)=	0.32019016E 10	A(17,18)=	-0.13307044E 10	A(17,16)=	-0.10911977E 10
A(18,18)=	0.37194258E 10	A(18,19)=	-0.15073385E 10	A(18,17)=	-0.14095875E 10
A(19,19)=	0.36371612E 10	A(19,20)=	-0.11209403E 10	A(19,18)=	-0.15862218E 10
A(20,20)=	0.32107914E 10	A(20,21)=	-0.12234683E 10	A(20,19)=	-0.11998234E 10
A(21,21)=	0.34772705E 10			A(21,20)=	-0.13023516E 10
B(21,21)=	0.0				

I	J	1	2	3	4	5
1		0.19644471E-03	0.39809856E-05	0.69193050E-07	0.26030185E-08	0.92629779E-10
2		0.10777620E-03	0.19787614E-03	0.34392615E-05	0.12938375E-06	0.46041890E-08
3		0.49918046E-04	0.91649155E-04	0.16669781E-03	0.62711115E-05	0.22316078E-06
4		0.21559681E-04	0.39583421E-04	0.71997129E-04	0.14815708E-03	0.52722480E-05
5		0.87171229E-05	0.16004575E-04	0.29110248E-04	0.59903687E-04	0.13815780E-03
6		0.26121306E-05	0.47958501E-05	0.87230237E-05	0.17950428E-04	0.41399719E-04
7		0.10039403E-05	0.18432283E-05	0.33525921E-05	0.68990321E-05	0.15911472E-04
8		0.43686208E-06	0.80207593E-06	0.14588713E-05	0.30020974E-05	0.69238331E-05
9		0.17522098E-06	0.32170419E-06	0.58513791E-06	0.12041100E-05	0.27770802E-05
10		0.81580481E-07	0.14978110E-06	0.27243181E-06	0.56061708E-06	0.12929704E-05
11		0.36410608E-07	0.66849566E-07	0.12159057E-06	0.25021183E-06	0.57707234E-06
12		0.94371266E-08	0.17326499E-07	0.31514624E-07	0.64851463E-07	0.14956919E-06
13		0.32110234E-08	0.58954086E-08	0.10722982E-07	0.22065986E-07	0.50891568E-07
14		0.12307055E-08	0.22595656E-08	0.41098538E-08	0.84573450E-08	0.19505478E-07
15		0.50125726E-09	0.92030361E-09	0.16739126E-08	0.34446144E-08	0.79444362E-08
16		0.12822847E-09	0.23542635E-09	0.42820969E-09	0.88117980E-09	0.20322961E-08
17		0.54482502E-10	0.10002936E-09	0.18194034E-09	0.37440073E-09	0.86349439E-09
18		0.25944885E-10	0.47634563E-10	0.86641028E-10	0.17829162E-09	0.41120085E-09
19		0.13070873E-10	0.23997998E-10	0.43649265E-10	0.89822288E-10	0.20716046E-09
20		0.56975024E-11	0.10460552E-10	0.19026405E-10	0.39152931E-10	0.90299782E-10
21		0.21339007E-11	0.39178183E-11	0.71260133E-11	0.14664048E-10	0.33820234E-10

I	J	6	7	8	9	10
1		0.27483105E-12	0.14857055E-14	0.52756640E-16	0.41128065E-17	0.73728810E-18
2		0.13660557E-10	0.73847395E-13	0.26222840E-14	0.20442823E-15	0.36647132E-16
3		0.66211459E-09	0.35793165E-11	0.12709967E-12	0.99084491E-14	0.17762529E-14
4		0.15642680E-07	0.84562607E-10	0.30027716E-11	0.23409047E-12	0.41964563E-13
5		0.40991227E-06	0.22159392E-08	0.78686779E-10	0.61342728E-11	0.10996690E-11
6		0.10418006E-03	0.56318589E-06	0.19998417E-07	0.15590385E-08	0.27948310E-09
7		0.40040381E-04	0.81434730E-04	0.28917020E-05	0.22543151E-06	0.40412296E-07
8		0.17423459E-04	0.35436125E-04	0.83215127E-04	0.64872902E-05	0.11629527E-05
9		0.69883654E-05	0.14213060E-04	0.33376753E-04	0.68869034E-04	0.12345907E-04
10		0.32536891E-05	0.66174016E-05	0.15539757E-04	0.32064505E-04	0.64465887E-04
11		0.14521711E-05	0.29534467E-05	0.69356320E-05	0.14310881E-04	0.28772134E-04
12		0.37638290E-06	0.76549298E-06	0.17976190E-05	0.37091841E-05	0.74573445E-05
13		0.12806584E-06	0.26046206E-06	0.61164781E-06	0.12620649E-05	0.25373911E-05
14		0.49084470E-07	0.99828696E-07	0.23442936E-06	0.48371840E-06	0.97251996E-06
15		0.19991742E-07	0.40659501E-07	0.95481369E-07	0.19701497E-06	0.39610073E-06
16		0.51141598E-08	0.10401248E-07	0.24425447E-07	0.50399098E-07	0.10132783E-06
17		0.21729336E-08	0.44193449E-08	0.10378031E-07	0.21413868E-07	0.43052783E-07
18		0.10347634E-08	0.21045179E-08	0.49420770E-08	0.10197414E-07	0.20501986E-07
19		0.52130789E-09	0.10602439E-08	0.24897895E-08	0.51373945E-08	0.10328783E-07
20		0.22723440E-09	0.46215276E-09	0.10852819E-08	0.22393554E-08	0.45022404E-08
21		0.85106672E-10	0.17309129E-09	0.40647374E-09	0.83871221E-09	0.16862369E-08

I	J	11	12	13	14	15
1		0.17244999E-18	0.23743980E-19	0.53340322E-20	0.16364856E-20	0.56532019E-21
2		0.85716748E-17	0.11802006E-17	0.26512974E-18	0.81341995E-19	0.28099400E-19
3		0.41546119E-15	0.57203258E-16	0.12850599E-16	0.39425719E-17	0.13619521E-17
4		0.98154076E-14	0.13514468E-14	0.30359969E-15	0.93144613E-16	0.32176571E-16
5		0.25721000E-12	0.35414275E-13	0.79557468E-14	0.24408279E-14	0.84317789E-15
6		0.65370445E-10	0.90006154E-11	0.20219694E-11	0.62034172E-12	0.21429538E-12
7		0.94523394E-08	0.13014581E-08	0.29236968E-09	0.89699234E-10	0.30986352E-10
8		0.27201196E-06	0.37452345E-07	0.84135863E-08	0.25812963E-08	0.89170094E-09
9		0.28876793E-05	0.39759391E-06	0.89318576E-07	0.27403036E-07	0.94662909E-08
10		0.15078424E-04	0.20760936E-05	0.46638957E-06	0.14308887E-06	0.49429570E-07
11		0.50099741E-04	0.68980553E-05	0.15496316E-05	0.47542881E-06	0.16423530E-06
12		0.12985171E-04	0.26513138E-04	0.59561135E-05	0.18273422E-05	0.63124924E-06
13		0.44182570E-05	0.90212061E-05	0.25475238E-04	0.78158346E-05	0.26999523E-05
14		0.16934091E-05	0.34576060E-05	0.97640323E-05	0.18506966E-04	0.63931684E-05
15		0.68971315E-06	0.14082561E-05	0.39768183E-05	0.75377568E-05	0.15148203E-04
16		0.17643799E-06	0.36025136E-06	0.10173244E-05	0.19282606E-05	0.38751186E-05
17		0.74965953E-07	0.15306574E-06	0.43224685E-06	0.81929107E-06	0.16464829E-05
18		0.35699234E-07	0.72890771E-07	0.20583849E-06	0.39015123E-06	0.78406458E-06
19		0.17985069E-07	0.36721943E-07	0.10370019E-06	0.19655590E-06	0.39500691E-06
20		0.78395637E-08	0.16006847E-07	0.45202174E-07	0.85677300E-07	0.17218099E-06
21		0.29361737E-08	0.59950871E-08	0.16929693E-07	0.32088955E-07	0.64487324E-07

I	J	16	17	18	19	20
1		0.11806067E-21	0.46536091E-22	0.20920629E-22	0.10015538E-22	0.40786696E-23
2		0.58682390E-20	0.23130900E-20	0.10398660E-20	0.49782500E-21	0.20273152E-21
3		0.28442812E-18	0.11211332E-18	0.50401355E-19	0.24129120E-19	0.98262110E-20
4		0.67197109E-17	0.26487150E-17	0.11907488E-17	0.57005871E-18	0.23214752E-18
5		0.17608813E-15	0.69408818E-16	0.31203225E-16	0.14938220E-16	0.60833633E-17
6		0.44753182E-13	0.17640400E-13	0.79303663E-14	0.37965812E-14	0.15460998E-14
7		0.64711552E-11	0.25507400E-11	0.11467025E-11	0.54897260E-12	0.22356075E-12
8		0.18622186E-09	0.73403186E-10	0.32998909E-10	0.15797905E-10	0.64334588E-11
9		0.19769306E-08	0.77924822E-09	0.35031622E-09	0.16771046E-09	0.68297576E-10
10		0.10322822E-07	0.40689514E-08	0.18292259E-08	0.87572372E-09	0.35662540E-09
11		0.34298729E-07	0.13519553E-07	0.60778085E-08	0.29096914E-08	0.11849279E-08
12		0.13182944E-06	0.51963323E-07	0.23360464E-07	0.11183591E-07	0.45543516E-08
13		0.56385562E-06	0.22225538E-06	0.99916406E-07	0.47834000E-07	0.19479678E-07
14		0.13351428E-05	0.52627433E-06	0.23659027E-06	0.11326523E-06	0.46125589E-07
15		0.31635363E-05	0.12469727E-05	0.56058553E-06	0.26837461E-06	0.10929153E-06
16		0.10337174E-04	0.40746108E-05	0.18317696E-05	0.87694139E-06	0.35712117E-06
17		0.43921236E-05	0.79612546E-05	0.35790363E-05	0.17134280E-05	0.69776803E-06
18		0.20915541E-05	0.37911959E-05	0.71096938E-05	0.34036957E-05	0.13861045E-05
19		0.10537115E-05	0.19099834E-05	0.35818221E-05	0.67964620E-05	0.27677579E-05
20		0.45930545E-06	0.83254866E-06	0.15612914E-05	0.29625317E-05	0.70192100E-05
21		0.17202501E-06	0.31181679E-06	0.58475422E-06	0.11095644E-05	0.26289244E-05

I	J 21
1	0.14350705E-23
2	0.71330621E-22
3	0.34573274E-20
4	0.81680570E-19
5	0.21404159E-17
6	0.54399124E-15
7	0.78659193E-13
8	0.22635921E-11
9	0.24030278E-10
10	0.12547753E-09
11	0.41691339E-09
12	0.16024342E-08
13	0.68538633E-08
14	0.16229141E-07
15	0.38453919E-07
16	0.12565204E-06
17	0.24550758E-06
18	0.48769675E-06
19	0.97382781E-06
20	0.24696892E-05
21	0.55262881E-05

ALPHA A MATRIX INVERSE L

I	FINAL ANSWERS
1	0.45443794E-05
2	0.22587976E-03
3	0.10948177E-01
4	0.11211649E-01
5	0.17491460E 00
6	0.52816373E 00
7	0.20301640E 00
8	0.88995576E-01
9	0.42475488E-01
10	0.28723411E-01
11	0.13817206E-01
12	0.35812324E-02
13	0.12185287E-02
14	0.46703196E-03
15	0.19021875E-03
16	0.48860499E-04
17	0.20675172E-04
18	0.98563996E-05
19	0.49601749E-05
20	0.21621026E-05
21	0.80977918E-06

SECTION D - SAMPLE INPUT & OUTPUT

αB^{-1}

IMAT = 2

INDEX(3) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 2
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 0 ALPHA A MATRIX INVERSE
INDEX(2)= 0 ALPHA A MATRIX INVERSE L
INDEX(3)= 1 ALPHA B MATRIX INVERSE
INDEX(4)= 0 ALPHA B MATRIX INVERSE F
INDEX(5)= 0 ALPHA B A MATRIX INVERSE
INDEX(6)= 0 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 0 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 0 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFP = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11880.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
1	20.000	0.0	0.0	0 - 1	0.0	0.500000E 03
2	20.000	0.0	-0.700000E 03	1 - 2	0.500000E-01	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	2 - 3	0.100000E 00	0.500000E 03
4	20.000	0.0	-0.248000E 05	3 - 4	0.150000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	4 - 5	0.200000E 00	0.502000E 03
6	20.000	0.457200E 04	-0.372000E 05	5 - 6	0.250000E 00	0.528000E 03
7	20.000	0.0	-0.604000E 05	6 - 7	0.350000E 00	0.864000E 03
8	20.000	0.0	-0.380000E 05	7 - 8	0.450000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	8 - 9	0.550000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	9 - 10	0.650000E 00	0.903000E 03
11	20.000	0.230000E 02	-0.303000E 05	10 - 11	0.750000E 00	0.907000E 03
12	20.000	0.0	-0.682000E 05	11 - 12	0.900000E 00	0.910000E 03
13	20.000	0.0	-0.321000E 05	12 - 13	0.120000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	13 - 14	0.150000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	14 - 15	0.195000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	15 - 16	0.280000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	16 - 17	0.390000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	17 - 18	0.530000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	18 - 19	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	19 - 20	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	20 - 21	0.600000E 01	0.913000E 03
				21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	E (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.894302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.746496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350124E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479984E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137097E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

B-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
B(1, 1)=	0.74856864E 08	B(1, 2)=	-0.16569040E 07	B(2, 1)=	-0.44856980E 08
B(2, 2)=	0.80141184E 08	B(2, 3)=	-0.16843470E 07	B(3, 2)=	-0.44884320E 08
B(3, 3)=	0.12179539E 09	B(3, 4)=	-0.41383280E 07	B(4, 3)=	-0.47511120E 08
B(4, 4)=	0.18369682E 09	B(4, 5)=	-0.41857280E 07	B(5, 4)=	-0.47558512E 08
B(5, 5)=	0.17176107E 09	B(5, 6)=	-0.45620800E 06	B(6, 5)=	-0.46075392E 08
B(6, 6)=	0.28417050E 09	B(6, 7)=	-0.10649600E 07	B(7, 6)=	-0.75714544E 08
B(7, 7)=	0.64081613E 09	B(7, 8)=	-0.69323200E 07	B(8, 7)=	-0.84951504E 08
B(8, 8)=	0.43377408E 09	B(8, 9)=	-0.18822752E 08	B(9, 8)=	-0.96841936E 08
B(9, 9)=	0.57228979E 09	B(9,10)=	-0.48848224E 08	B(10, 9)=	-0.12686741E 09
B(10,10)=	0.49950182E 09	B(10,11)=	-0.46289104E 08	B(11,10)=	-0.16465389E 09
B(11,11)=	0.61281126E 09	B(11,12)=	-0.89098464E 08	B(12,11)=	-0.16772245E 09
B(12,12)=	0.13292677E 10	B(12,13)=	-0.15328653E 09	B(13,12)=	-0.23216971E 09
B(13,13)=	0.10586358E 10	B(13,14)=	-0.31646618E 09	B(14,13)=	-0.39534925E 09
B(14,14)=	0.18609587E 10	B(14,15)=	-0.44060954E 09	B(15,14)=	-0.51949286E 09
B(15,15)=	0.21241917E 10	B(15,16)=	-0.35069901E 09	B(16,15)=	-0.42958234E 09
B(16,16)=	0.30438953E 10	B(16,17)=	-0.10123144E 10	B(17,16)=	-0.10911977E 10
B(17,17)=	0.42939013E 10	B(17,18)=	-0.13307044E 10	B(18,17)=	-0.14095875E 10
B(18,18)=	0.48429220E 10	B(18,19)=	-0.15073385E 10	B(19,18)=	-0.15862218E 10
B(19,19)=	0.49391575E 10	B(19,20)=	-0.11209403E 10	B(20,19)=	-0.11998234E 10
B(20,20)=	0.43132887E 10	B(20,21)=	-0.12234683E 10	B(21,20)=	-0.13023516E 10
B(21,21)=	0.48422666E 10				

I	J	1	2	3	4	5
1		0.21644370E-03	0.45101733E-05	0.62929132E-07	0.14266754E-08	0.34782302E-10
2		0.12210278E-03	0.20376421E-03	0.28430622E-05	0.64455435E-07	0.15714217E-08
3		0.45399094E-04	0.75761694E-04	0.13359697E-03	0.30287947E-05	0.73841932E-07
4		0.11816545E-04	0.19719373E-04	0.34772864E-04	0.88441593E-04	0.21562028E-05
5		0.32732660E-05	0.54624034E-05	0.96323156E-05	0.24498935E-04	0.93789889E-04
6		0.53096301E-06	0.88606765E-06	0.15624773E-05	0.39740189E-05	0.15213877E-04
7		0.62869219E-07	0.10491561E-06	0.18500674E-06	0.47054800E-06	0.18014134E-05
8		0.12405692E-07	0.20702537E-07	0.36506545E-07	0.92851110E-07	0.35546475E-06
9		0.21481539E-08	0.35848251E-08	0.63214252E-08	0.16077955E-07	0.61551816E-07
10		0.57269745E-09	0.95571373E-09	0.16852924E-08	0.42863846E-08	0.16409718E-07
11		0.15683337E-09	0.26172220E-09	0.46151727E-09	0.11738266E-08	0.44938062E-08
12		0.20340341E-10	0.33943806E-10	0.59856037E-10	0.15223840E-09	0.58281957E-09
13		0.47838521E-11	0.79832616E-11	0.14077572E-10	0.35804998E-10	0.13707356E-09
14		0.10805159E-11	0.18031583E-11	0.31796649E-11	0.80871854E-11	0.30960456E-10
15		0.27122673E-12	0.45262156E-12	0.79814557E-12	0.20300116E-11	0.77715638E-11
16		0.42250136E-13	0.70506697E-13	0.12433050E-12	0.31622339E-12	0.12106097E-11
17		0.11943741E-13	0.19931624E-13	0.35147100E-13	0.89393499E-13	0.34222842E-12
18		0.38941662E-14	0.64985554E-14	0.11459458E-13	0.29146058E-13	0.11158099E-12
19		0.13423626E-14	0.22401258E-14	0.39502025E-14	0.10046983E-13	0.38463234E-13
20		0.40424330E-15	0.67459822E-15	0.11895750E-14	0.30255775E-14	0.11582932E-13
21		0.10872322E-15	0.18143663E-15	0.31994234E-15	0.81374476E-15	0.31152887E-14

I	J	6	7	8	9	10
1		0.55864455E-13	0.93038628E-16	0.14981440E-17	0.50421767E-19	0.51757822E-20
2		0.25238865E-11	0.42033671E-14	0.67684312E-16	0.22779950E-17	0.23383564E-18
3		0.11859876E-09	0.19751854E-12	0.31805202E-14	0.10704415E-15	0.10988060E-16
4		0.34631134E-08	0.57675930E-11	0.92871999E-13	0.31257161E-14	0.32085417E-15
5		0.15063762E-06	0.25087732E-09	0.40397234E-11	0.13596161E-12	0.13956440E-13
6		0.56353660E-04	0.93853430E-07	0.15112640E-08	0.50863341E-10	0.52211178E-11
7		0.66726179E-05	0.25032670E-04	0.40308601E-06	0.13566318E-07	0.13925820E-08
8		0.13166773E-05	0.49395821E-05	0.37244332E-04	0.12535002E-05	0.12867179E-06
9		0.22799406E-06	0.85533225E-06	0.64491842E-05	0.28825933E-04	0.29589810E-05
10		0.60783236E-07	0.22803152E-06	0.17193524E-05	0.76849919E-05	0.34411350E-04
11		0.16645490E-07	0.62446418E-07	0.47084467E-06	0.21045353E-05	0.94235584E-05
12		0.21588198E-08	0.80989260E-08	0.61065691E-07	0.27294561E-06	0.12221781E-05
13		0.50773385E-09	0.19047888E-08	0.14362065E-07	0.64194182E-07	0.28744472E-06
14		0.11468056E-09	0.43022985E-09	0.32439216E-08	0.14499385E-07	0.64924393E-07
15		0.28786612E-10	0.10799450E-09	0.81427576E-09	0.36395729E-08	0.16297044E-07
16		0.44842125E-11	0.16822752E-10	0.12684319E-09	0.56695182E-09	0.25386611E-08
17		0.12676466E-11	0.47556386E-11	0.35857456E-10	0.16027207E-09	0.71765704E-09
18		0.41330654E-12	0.15505409E-11	0.11691054E-10	0.52255533E-10	0.23398661E-09
19		0.14247148E-12	0.53448901E-12	0.40300333E-11	0.18013063E-10	0.80657800E-10
20		0.42904269E-13	0.16095767E-12	0.12136169E-11	0.54245037E-11	0.24289543E-10
21		0.11539323E-13	0.43290370E-13	0.32640833E-12	0.14589484E-11	0.65327917E-11

I	J	11	12	13	14	15
1		0.74280274E-21	0.51176714E-22	0.79467718E-23	0.14367784E-23	0.30589023E-24
2		0.33558911E-19	0.23121007E-20	0.35902526E-21	0.64911906E-22	0.13819745E-22
3		0.15769504E-17	0.10864676E-18	0.16870778E-19	0.30502451E-20	0.64939716E-21
4		0.46047358E-16	0.31725131E-17	0.49263108E-18	0.89067913E-19	0.18962560E-19
5		0.20029566E-14	0.13799719E-15	0.21428345E-16	0.38742551E-17	0.82482909E-18
6		0.74930757E-12	0.51624869E-13	0.80163605E-14	0.14493625E-14	0.30856902E-15
7		0.19985608E-09	0.13769435E-10	0.21381317E-11	0.38657543E-12	0.82301841E-13
8		0.18466295E-07	0.12722678E-08	0.19755914E-09	0.35718803E-10	0.76045255E-11
9		0.42465740E-06	0.29257524E-07	0.45431392E-08	0.82140206E-09	0.17487643E-09
10		0.49385380E-05	0.34024936E-06	0.52834277E-07	0.95524690E-08	0.20337194E-08
11		0.27963368E-04	0.19265854E-05	0.29916220E-06	0.54088744E-07	0.11515478E-07
12		0.36266856E-05	0.12622109E-04	0.19599738E-05	0.35436449E-06	0.75444120E-07
13		0.85296188E-06	0.29686007E-05	0.16669132E-04	0.30137899E-05	0.64163561E-06
14		0.19265627E-06	0.67050962E-06	0.37650161E-05	0.98216933E-05	0.20910375E-05
15		0.48359745E-07	0.16830853E-06	0.94507845E-06	0.24654009E-05	0.82559836E-05
16		0.75332061E-08	0.26218125E-07	0.14721888E-06	0.38404545E-06	0.12860692E-05
17		0.21295690E-08	0.74116322E-08	0.41617458E-07	0.10856633E-06	0.36356005E-06
18		0.69433037E-09	0.24165070E-08	0.13569064E-07	0.35397225E-07	0.11853615E-06
19		0.23934343E-09	0.83299767E-09	0.46774069E-08	0.12201831E-07	0.40860744E-07
20		0.72076567E-10	0.25085134E-09	0.14085684E-08	0.36744956E-08	0.12304930E-07
21		0.19385368E-10	0.67467670E-10	0.37884162E-09	0.98827369E-09	0.33094740E-08

I	J	16	17	18	19	20
1		0.38900016E-25	0.10201709E-25	0.31400533E-26	0.10285841E-26	0.28939580E-27
2		0.17574543E-23	0.46090061E-24	0.14186381E-24	0.46470172E-25	0.13074103E-25
3		0.82583677E-22	0.21657955E-22	0.66662533E-23	0.21836569E-23	0.61435910E-24
4		0.24114641E-20	0.63241775E-21	0.19465630E-21	0.63763324E-22	0.17939454E-22
5		0.10489327E-18	0.27508751E-19	0.84671112E-20	0.27735622E-20	0.78032576E-21
6		0.39240654E-16	0.10291047E-16	0.31675525E-17	0.10375914E-17	0.29192041E-18
7		0.10466305E-13	0.27448382E-14	0.84485247E-15	0.27674747E-15	0.77861320E-16
8		0.96706497E-12	0.25361749E-12	0.78062665E-13	0.25570905E-13	0.71942303E-14
9		0.22238975E-10	0.58322826E-11	0.17951560E-11	0.58803776E-12	0.16544107E-12
10		0.25862734E-09	0.67826328E-10	0.20876703E-10	0.68385644E-11	0.19239905E-11
11		0.14644197E-08	0.38405168E-09	0.11820969E-09	0.38721845E-10	0.10894168E-10
12		0.95942063E-08	0.25161295E-08	0.77445539E-09	0.25368774E-09	0.71373569E-10
13		0.81596568E-07	0.21399117E-07	0.65865677E-08	0.21575579E-08	0.60701622E-09
14		0.26591658E-06	0.69737951E-07	0.21465091E-07	0.70313035E-08	0.19782160E-08
15		0.10499107E-05	0.27534441E-06	0.84750013E-07	0.27761498E-07	0.78105309E-08
16		0.59654321E-05	0.15644646E-05	0.48153657E-06	0.15773657E-06	0.44378236E-07
17		0.16863751E-05	0.45872957E-05	0.14119532E-05	0.46251222E-06	0.13012504E-06
18		0.54982974E-06	0.14956540E-05	0.41612075E-05	0.13630834E-05	0.38349521E-06
19		0.18953261E-06	0.51556913E-06	0.14344168E-05	0.39469260E-05	0.11104439E-05
20		0.57076413E-07	0.15526001E-06	0.43196468E-06	0.11885886E-05	0.43502296E-05
21		0.15350970E-07	0.41757971E-07	0.11617914E-06	0.38967693E-06	0.11700167E-05

I	J 21
1	0.73117629E-28
2	0.33033612E-26
3	0.15522682E-24
4	0.45326622E-23
5	0.19716059E-21
6	0.73757886E-19
7	0.19672777E-16
8	0.18177251E-14
9	0.41801062E-13
10	0.48612405E-12
11	0.27525681E-11
12	0.18033561E-10
13	0.15337140E-09
14	0.49982463E-09
15	0.19734439E-08
16	0.11212805E-07
17	0.32877978E-07
18	0.96895633E-07
19	0.28056974E-06
20	0.10991498E-05
21	0.35998619E-05

SECTION E - SAMPLE INPUT & OUTPUT

αFB^{-1}

IMAT = 2

INDEX(4) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 2
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 0 ALPHA A MATRIX INVERSE
INDEX(2)= 0 ALPHA A MATRIX INVERSE L
INDEX(3)= 0 ALPHA B MATRIX INVERSE
INDEX(4)= 1 ALPHA B MATRIX INVERSE F
INDEX(5)= 0 ALPHA B A MATRIX INVERSE
INDEX(6)= 0 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 0 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 0 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFP = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11880.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
				0 - 1	0.0	0.500000E 03
1	20.000	0.0	0.0	1 - 2	0.500000E-01	0.500000E 03
2	20.000	0.0	-0.700000E 03	2 - 3	0.100000E 00	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	3 - 4	0.150000E 00	0.502000E 03
4	20.000	0.0	-0.248000E 05	4 - 5	0.200000E 00	0.507000E 03
5	20.000	0.123900E 04	-0.253000E 05	5 - 6	0.250000E 00	0.528000E 03
6	20.000	0.457200E 04	-0.372000E 05	6 - 7	0.350000E 00	0.844000E 03
7	20.000	0.0	-0.604000E 05	7 - 8	0.450000E 00	0.903000E 03
8	20.000	0.0	-0.380000E 05	8 - 9	0.550000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	9 - 10	0.650000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	10 - 11	0.750000E 00	0.907000E 03
11	20.000	0.230000E 02	-0.303000E 05	11 - 12	0.900000E 00	0.910000E 03
12	20.000	0.0	-0.682000E 05	12 - 13	0.120000E 01	0.913000E 03
13	20.000	0.0	-0.321000E 05	13 - 14	0.150000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	14 - 15	0.195000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	15 - 16	0.280000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	16 - 17	0.390000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	17 - 18	0.530000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	18 - 19	0.600000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	19 - 20	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	20 - 21	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	E (CU.FT./DAY)	Q (CU.FT./DAY)
1	0.120	0.150	7.770	0 - 1	0.100000E 01	0.0	0.432000E 08
2	0.140	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
3	0.220	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
4	0.330	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
5	0.270	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
6	0.400	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
7	0.730	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.746496E 08
8	0.500	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
9	0.540	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
10	0.440	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
11	0.390	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
12	0.400	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
13	0.300	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
14	0.410	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
15	0.380	0.150	7.770	14 - 15	0.500852E 00	0.479984E 09	0.788832E 08
16	0.360	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
17	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
18	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
19	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
20	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
21	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
				21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

B-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
B(1, 1)=	0.74856864E 08	B(1, 2)=	-0.16569040E 07		
B(2, 2)=	0.80141184E 08	B(2, 3)=	-0.14843470E 07	B(2, 1)=	-0.44856880E 08
B(3, 3)=	0.12179539E 09	B(3, 4)=	-0.41383280E 07	B(3, 2)=	-0.44884320E 08
B(4, 4)=	0.18369682E 09	B(4, 5)=	-0.41857280E 07	B(4, 3)=	-0.47511120E 08
B(5, 5)=	0.17176107E 09	B(5, 6)=	-0.45620800E 06	B(5, 4)=	-0.47558512E 08
B(6, 6)=	0.28417050E 09	B(6, 7)=	-0.10649600E 07	B(6, 5)=	-0.46075392E 08
B(7, 7)=	0.64081613E 09	B(7, 8)=	-0.69323200E 07	B(7, 6)=	-0.75714544E 08
B(8, 8)=	0.43377408E 09	B(8, 9)=	-0.18822752E 08	B(8, 7)=	-0.84951504E 08
B(9, 9)=	0.57228979E 09	B(9,10)=	-0.48848224E 08	B(9, 8)=	-0.96841936E 08
B(10,10)=	0.49950182E 09	B(10,11)=	-0.86289104E 08	B(10, 9)=	-0.12686741E 09
B(11,11)=	0.61281126E 09	B(11,12)=	-0.89098464E 08	B(11,10)=	-0.16465389E 09
B(12,12)=	0.13292677E 10	B(12,13)=	-0.15328653E 09	B(12,11)=	-0.16772245E 09
B(13,13)=	0.10586358E 10	B(13,14)=	-0.31646618E 09	B(13,12)=	-0.23216971E 09
B(14,14)=	0.18609587E 10	B(14,15)=	-0.44060954E 09	B(14,13)=	-0.39534925E 09
B(15,15)=	0.21241917E 10	B(15,16)=	-0.35069901E 09	B(15,14)=	-0.51949286E 09
B(16,16)=	0.30438953E 10	B(16,17)=	-0.10123144E 10	B(16,15)=	-0.42958234E 09
B(17,17)=	0.42939013E 10	B(17,18)=	-0.13307044E 10	B(17,16)=	-0.10911977E 10
B(18,18)=	0.48429220E 10	B(18,19)=	-0.15073385E 10	B(18,17)=	-0.14095875E 10
B(19,19)=	0.49391575E 10	B(19,20)=	-0.11209403E 10	B(19,18)=	-0.15862218E 10
B(20,20)=	0.43132887E 10	B(20,21)=	-0.12234683E 10	B(20,19)=	-0.11998234E 10
B(21,21)=	0.48422666E 10			B(21,20)=	-0.13023516E 10

ALPHA B MATRIX INVERSE F

I	FINAL ANSWERS
1	-0.38415543E-02
2	-0.17355675E 00
3	-0.15060654E 01
4	-0.26199942E 01
5	-0.30891132E 01
6	-0.26022635E 01
7	-0.18353462E 01
8	-0.18310022E 01
9	-0.16112576E 01
10	-0.15556459E 01
11	-0.13702049E 01
12	-0.11081715E 01
13	-0.99193245E 00
14	-0.88227552E 00
15	-0.94078726E 00
16	-0.82828283E 00
17	-0.80633312E 00
18	-0.78522062E 00
19	-0.58843279E 00
20	-0.62664169E 00
21	-0.49962330E 00

SECTION F - SAMPLE INPUT & OUTPUT

αB^{-1} and αFB^{-1}

IMAT = 2

INDEX(3) and INDEX(4) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 2
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 0 ALPHA A MATRIX INVERSE
INDEX(2)= 0 ALPHA A MATRIX INVERSE L
INDEX(3)= 1 ALPHA B MATRIX INVERSE
INDEX(4)= 1 ALPHA B MATRIX INVERSE F
INDEX(5)= 0 ALPHA B A MATRIX INVERSE
INDEX(6)= 0 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VO(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 0 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 0 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFP = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11880.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
				0 - 1	0.0	0.500000E 03
1	20.000	0.0	0.0	1 - 2	0.500000E-01	0.500000E 03
2	20.000	0.0	-0.700000E 03	2 - 3	0.100000E 00	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	3 - 4	0.150000E 00	0.502000E 03
4	20.000	0.0	-0.248000E 05	4 - 5	0.200000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	5 - 6	0.250000E 00	0.528000E 03
6	20.000	0.457200E 04	-0.372000E 05	6 - 7	0.350000E 00	0.864000E 03
7	20.000	0.0	-0.604000E 05	7 - 8	0.450000E 00	0.903000E 03
8	20.000	0.0	-0.380000E 05	8 - 9	0.550000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	9 - 10	0.650000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	10 - 11	0.750000E 00	0.907000E 03
11	20.000	0.230000E 02	-0.303000E 05	11 - 12	0.900000E 00	0.910000E 03
12	20.000	0.0	-0.682000E 05	12 - 13	0.120000E 01	0.913000E 03
13	20.000	0.0	-0.321000E 05	13 - 14	0.150000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	14 - 15	0.195000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	15 - 16	0.280000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	16 - 17	0.390000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	17 - 18	0.530000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	18 - 19	0.600000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	19 - 20	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	20 - 21	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	E (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.746496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479984E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

B-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
B(1, 1)=	0.74856864E 08	B(1, 2)=	-0.16569040E 07	B(2, 1)=	-0.44856880E 08
B(2, 2)=	0.80141184E 08	B(2, 3)=	-0.16843470E 07	B(3, 2)=	-0.44884320E 08
B(3, 3)=	0.12179539E 09	B(3, 4)=	-0.41383280E 07	B(4, 3)=	-0.47511120E 08
B(4, 4)=	0.18369682E 09	B(4, 5)=	-0.41857280E 07	B(5, 4)=	-0.47558512E 08
B(5, 5)=	0.17176107E 09	B(5, 6)=	-0.45620800E 06	B(6, 5)=	-0.46075392E 08
B(6, 6)=	0.28417050E 09	B(6, 7)=	-0.10649600E 07	B(7, 6)=	-0.75714544E 08
B(7, 7)=	0.6408161 E 09	B(7, 8)=	-0.69323200E 07	B(8, 7)=	-0.84951504E 08
B(8, 8)=	0.43377408E 09	B(8, 9)=	-0.18822752E 08	B(9, 8)=	-0.96841936E 08
B(9, 9)=	0.57228979E 09	B(9,10)=	-0.48848224E 08	B(10, 9)=	-0.12686741E 09
B(10,10)=	0.49950182E 09	B(10,11)=	-0.86289104E 08	B(11,10)=	-0.16465389E 09
B(11,11)=	0.61281126E 09	B(11,12)=	-0.89098464E 08	B(12,11)=	-0.16772245E 09
B(12,12)=	0.13292677E 10	B(12,13)=	-0.15328653E 09	B(13,12)=	-0.23216971E 09
B(13,13)=	0.10586358E 10	B(13,14)=	-0.31646618E 09	B(14,13)=	-0.39534925E 09
B(14,14)=	0.18609587E 10	B(14,15)=	-0.44060954E 09	B(15,14)=	-0.51949286E 09
B(15,15)=	0.21241917E 10	B(15,16)=	-0.35069901E 09	B(16,15)=	-0.42958234E 09
B(16,16)=	0.30438953E 10	B(16,17)=	-0.10123144E 10	B(17,16)=	-0.10911977E 10
B(17,17)=	0.42939013E 10	B(17,18)=	-0.13307044E 10	B(18,17)=	-0.14095875E 10
B(18,18)=	0.48429220E 10	B(18,19)=	-0.15073385E 10	B(19,18)=	-0.15862218E 10
B(19,19)=	0.49391575E 10	B(19,20)=	-0.11209403E 10	B(20,19)=	-0.11998234E 10
B(20,20)=	0.43132887E 10	B(20,21)=	-0.12234683E 10	B(21,20)=	-0.13023516E 10
B(21,21)=	0.48422666E 10				

I	J	1	2	3	4	5
1		0.21644370E-03	0.45101733E-05	0.62929132E-07	0.14266754E-08	0.34782302E-10
2		0.12210278E-03	0.20376421E-03	0.28430622E-05	0.64455435E-07	0.15714217E-08
3		0.45399094E-04	0.75761694E-04	0.13359697E-03	0.30287947E-05	0.73841932E-07
4		0.11816545E-04	0.19719373E-04	0.34772864E-04	0.88441593E-04	0.21562028E-05
5		0.32732660E-05	0.54624034E-05	0.96323156E-05	0.24498935E-04	0.93789989E-04
6		0.53096301E-06	0.88606765E-06	0.15624773E-05	0.39740189E-05	0.15213877E-04
7		0.62869219E-07	0.10491561E-06	0.18500674E-06	0.47054800E-06	0.18014134E-05
8		0.12405692E-07	0.20702537E-07	0.36506545E-07	0.92851110E-07	0.35546475E-06
9		0.21481539E-08	0.35848251E-08	0.63214252E-08	0.16077955E-07	0.61551816E-07
10		0.57269745E-09	0.95571373E-09	0.16852924E-08	0.42863846E-08	0.16409718E-07
11		0.15683337E-09	0.26172220E-09	0.46151727E-09	0.11738266E-08	0.44938062E-08
12		0.20340341E-10	0.33943806E-10	0.59856037E-10	0.15223840E-09	0.58281957E-09
13		0.47838521E-11	0.79832616E-11	0.14077572E-10	0.35804998E-10	0.13707356E-09
14		0.10805159E-11	0.18031583E-11	0.31796649E-11	0.80871854E-11	0.30960456E-10
15		0.27122673E-12	0.45262156E-12	0.79814557E-12	0.20300116E-11	0.77715638E-11
16		0.42250136E-13	0.70506697E-13	0.12433050E-12	0.31622339E-12	0.12106097E-11
17		0.11943741E-13	0.19931624E-13	0.35147100E-13	0.89393499E-13	0.34222842E-12
18		0.38941662E-14	0.64985554E-14	0.11459458E-13	0.29146058E-13	0.11158099E-12
19		0.13423626E-14	0.22401258E-14	0.39502025E-14	0.10046983E-13	0.38463234E-13
20		0.40424330E-15	0.67459822E-15	0.11895750E-14	0.30255775E-14	0.11582932E-13
21		0.10872322E-15	0.18143663E-15	0.31994234E-15	0.81374476E-15	0.31152887E-14

I	J	6	7	8	9	10
1		0.55864455E-13	0.93038628E-16	0.14981440E-17	0.50421767E-19	0.51757922E-20
2		0.25238865E-11	0.42033671E-14	0.67684312E-16	0.22779950E-17	0.23383564E-18
3		0.11859876E-09	0.19751854E-12	0.31805202E-14	0.10704415E-15	0.10988060E-16
4		0.34631134E-08	0.57675930E-11	0.92871999E-13	0.31257161E-14	0.32085417E-15
5		0.15063762E-06	0.25087732E-09	0.40397234E-11	0.13596161E-12	0.13956440E-13
6		0.56353660E-04	0.93853430E-07	0.15112640E-08	0.50863341E-10	0.52211178E-11
7		0.66726179E-05	0.25032670E-04	0.40308601E-06	0.13566318E-07	0.13925820E-08
8		0.13166773E-05	0.49395821E-05	0.37244332E-04	0.12535002E-05	0.12867179E-06
9		0.22799406E-06	0.85533225E-06	0.64491842E-05	0.28825933E-04	0.29589810E-05
10		0.60783236E-07	0.22803152E-06	0.17193524E-05	0.76849919E-05	0.34411350E-04
11		0.16645490E-07	0.62466418E-07	0.47084467E-06	0.21045353E-05	0.94235584E-05
12		0.21588198E-08	0.80989260E-08	0.61065691E-07	0.27294561E-06	0.12221781E-05
13		0.50773385E-09	0.19047888E-08	0.14362065E-07	0.64194182E-07	0.28744472E-06
14		0.11468056E-09	0.43022985E-09	0.32439216E-08	0.14499385E-07	0.64924393E-07
15		0.28786612E-10	0.10799450E-09	0.81427576E-09	0.36395729E-08	0.16297044E-07
16		0.44842125E-11	0.16822752E-10	0.12684319E-09	0.56695182E-09	0.25386611E-08
17		0.12676466E-11	0.47556386E-11	0.35857456E-10	0.16027207E-09	0.71765704E-09
18		0.41330654E-12	0.15505409E-11	0.11691054E-10	0.52255533E-10	0.23398661E-09
19		0.14247148E-12	0.53448901E-12	0.40300333E-11	0.18013063E-10	0.80657800E-10
20		0.42904269E-13	0.16095767E-12	0.12136169E-11	0.54245037E-11	0.24289543E-10
21		0.11539323E-13	0.43290370E-13	0.32640833E-12	0.14589484E-11	0.65327917E-11

I	J	11	12	13	14	15
1		0.74280274E-21	0.51176714E-22	0.79467718E-23	0.14367784E-23	0.30589023E-24
2		0.33558911E-19	0.23121007E-20	0.35902526E-21	0.64911906E-22	0.13819745E-22
3		0.15769504E-17	0.10864676E-18	0.16870778E-19	0.30502451E-20	0.64939716E-21
4		0.46047358E-16	0.31725131E-17	0.49263108E-18	0.89067913E-19	0.18962560E-19
5		0.20029566E-14	0.13799719E-15	0.21428345E-16	0.38742551E-17	0.82482909E-18
6		0.74930757E-12	0.51624869E-13	0.80163605E-14	0.14493625E-14	0.30856902E-15
7		0.19985608E-09	0.13769435E-10	0.21381317E-11	0.38657543E-12	0.82301841E-13
8		0.18466295E-07	0.12722678E-08	0.19755914E-09	0.35718803E-10	0.76045255E-11
9		0.42465740E-06	0.29257524E-07	0.45431392E-08	0.82140206E-09	0.17487643E-09
10		0.49385380E-05	0.34024936E-06	0.52834277E-07	0.95524690E-08	0.20337194E-08
11		0.27963368E-04	0.19265854E-05	0.29916220E-06	0.54088744E-07	0.11515478E-07
12		0.36266856E-05	0.12622109E-04	0.19599738E-05	0.35436449E-06	0.75444120E-07
13		0.85296188E-06	0.29686007E-05	0.16669132E-04	0.30137899E-05	0.64163561E-06
14		0.19265627E-06	0.67050962E-06	0.37650161E-05	0.98216933E-05	0.20910375E-05
15		0.48359745E-07	0.16830853E-06	0.94507845E-06	0.24654009E-05	0.82559836E-05
16		0.75332061E-08	0.26218125E-07	0.14721888E-06	0.38404545E-06	0.12860692E-05
17		0.21295690E-08	0.74116322E-08	0.41617458E-07	0.10856633E-06	0.36356005E-06
18		0.69433037E-09	0.24165070E-08	0.13569064E-07	0.35397225E-07	0.11853615E-06
19		0.23934343E-09	0.83299767E-09	0.46774069E-08	0.12201831E-07	0.40860744E-07
20		0.72076567E-10	0.25085134E-09	0.14085684E-08	0.36744956E-08	0.12304930E-07
21		0.19385368E-10	0.67467670E-10	0.37884162E-09	0.98827369E-09	0.33094740E-08

I	J	16	17	18	19	20
1		0.389000016E-25	0.10201709E-25	0.31400533E-26	0.10285841E-26	0.28938580E-27
2		0.17574543E-23	0.46090061E-24	0.14186381E-24	0.46470172E-25	0.13074103E-25
3		0.82583677E-22	0.21657955E-22	0.66662533E-23	0.21836569E-23	0.61435910E-24
4		0.24114641E-20	0.63241775E-21	0.19465630E-21	0.63763324E-22	0.17939454E-22
5		0.10489327E-18	0.27508751E-19	0.84671112E-20	0.27735622E-20	0.78032576E-21
6		0.39240654E-16	0.10291047E-16	0.31675525E-17	0.10375914E-17	0.29192041E-18
7		0.10466305E-13	0.27448382E-14	0.84485247E-15	0.27674747E-15	0.77861320E-16
8		0.96706497E-12	0.25361749E-12	0.78062665E-13	0.25570905E-13	0.71942303E-14
9		0.22238975E-10	0.58322826E-11	0.17951560E-11	0.58803776E-12	0.16544107E-12
10		0.25862734E-09	0.67826328E-10	0.20876703E-10	0.68385644E-11	0.19239905E-11
11		0.14644197E-08	0.38405168E-09	0.11820969E-09	0.38721845E-10	0.10894168E-10
12		0.95942063E-08	0.25161295E-08	0.77445539E-09	0.25368774E-09	0.71373560E-10
13		0.81596568E-07	0.21399117E-07	0.65865677E-08	0.21575579E-08	0.60701622E-09
14		0.26591658E-06	0.69737951E-07	0.21465091E-07	0.70313035E-08	0.19782160E-08
15		0.10499107E-05	0.27534441E-06	0.84750013E-07	0.27761498E-07	0.78105309E-08
16		0.59654321E-05	0.15644646E-05	0.48153657E-06	0.15773657E-06	0.44378236E-07
17		0.16863751E-05	0.45872957E-05	0.14119532E-05	0.46251222E-06	0.13012504E-06
18		0.54982974E-06	0.14956540E-05	0.41612075E-05	0.13630834E-05	0.38349521E-06
19		0.18953261E-06	0.51556913E-06	0.14344168E-05	0.39469260E-05	0.11104439E-05
20		0.57076413E-07	0.15526001E-06	0.43196468E-06	0.11885886E-05	0.43502296E-05
21		0.15350970E-07	0.41757971E-07	0.11617914E-06	0.31967693E-06	0.11700167E-05

I	J 21
1	0.7311762SE-28
2	0.33033612E-26
3	0.15522682E-24
4	0.45326622E-23
5	0.19716059E-21
6	0.73757886E-19
7	0.19472777E-16
8	0.18177251E-14
9	0.41001062E-13
10	0.48612405E-12
11	0.27525681E-11
12	0.18033561E-10
13	0.15337140E-09
14	0.49982463E-09
15	0.19734439E-08
16	0.11212805E-07
17	0.32877978E-07
18	0.96895633E-07
19	0.28056974E-06
20	0.10991498E-05
21	0.35998619E-05

ALPHA B MATRIX INVERSE F

I	FINAL ANSWERS
1	-0.38415543E-02
2	-0.17355675E 00
3	-0.15060654E 01
4	-0.26199942E 01
5	-0.30891132E 01
6	-0.26022635E 01
7	-0.18353462E 01
8	-0.18310022E 01
9	-0.16112576E 01
10	-0.15556459E 01
11	-0.13702049E 01
12	-0.11081715E 01
13	-0.99193245E 00
14	-0.88227552E 00
15	-0.94078726E 00
16	-0.82828283E 00
17	-0.80633312E 00
18	-0.78522062E 00
19	-0.58843279E 00
20	-0.62664169E 00
21	-0.49962330E 00

SECTION G - SAMPLE INPUT & OUTPUT

$\alpha B^{-1}A^{-1}$

IMAT = 3

INDEX(5) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 3
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 0 ALPHA A MATRIX INVERSE
INDEX(2)= 0 ALPHA A MATRIX INVERSE L
INDEX(3)= 0 ALPHA B MATRIX INVERSE
INDEX(4)= 0 ALPHA B MATRIX INVERSE F
INDEX(5)= 1 ALPHA B A MATRIX INVERSE
INDEX(6)= 0 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 0 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 0 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFP = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11980.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
1	20.000	0.0	0.0	0 - 1	0.0	0.500000E 03
2	20.000	0.0	-0.700000E 03	1 - 2	0.500000E-01	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	2 - 3	0.100000E 00	0.500000E 03
4	20.000	0.0	-0.248000E 05	3 - 4	0.150000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	4 - 5	0.200000E 00	0.502000E 03
6	20.000	0.457200E 04	-0.372000E 05	5 - 6	0.250000E 00	0.528000E 03
7	20.000	0.0	-0.604000E 05	6 - 7	0.350000E 00	0.864000E 03
8	20.000	0.0	-0.380000E 05	7 - 8	0.450000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	8 - 9	0.550000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	9 - 10	0.650000E 00	0.903000E 03
11	20.000	0.230000E 02	-0.303000E 05	10 - 11	0.750000E 00	0.907000E 03
12	20.000	0.0	-0.682000E 05	11 - 12	0.900000E 00	0.910000E 03
13	20.000	0.0	-0.321000E 05	12 - 13	0.120000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	13 - 14	0.150000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	14 - 15	0.195000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	15 - 16	0.280000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	16 - 17	0.390000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	17 - 18	0.530000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	18 - 19	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	19 - 20	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	20 - 21	0.600000E 01	0.913000E 03
				21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	E (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.746496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479984E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

A-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
A(1, 1)=	0.82356864E 08	A(1, 2)=	-0.16569040E 07		
A(2, 2)=	0.82541184E 08	A(2, 3)=	-0.16843470E 07	A(2, 1)=	-0.44856880E 08
A(3, 3)=	0.98695408E 08	A(3, 4)=	-0.41383280E 07	A(3, 2)=	-0.44884320E 08
A(4, 4)=	0.11169682E 09	A(4, 5)=	-0.41857280E 07	A(4, 3)=	-0.47511120E 08
A(5, 5)=	0.11776109E 09	A(5, 6)=	-0.45620800E 06	A(5, 4)=	-0.47558512E 08
A(6, 6)=	0.15417074E 09	A(6, 7)=	-0.10649600E 07	A(6, 5)=	-0.46075392E 08
A(7, 7)=	0.20001643E 09	A(7, 8)=	-0.69323200E 07	A(7, 6)=	-0.75714544E 08
A(8, 8)=	0.20277424E 09	A(8, 9)=	-0.18822752E 08	A(8, 7)=	-0.84951504E 08
A(9, 9)=	0.26419011E 09	A(9,10)=	-0.48848224E 08	A(9, 8)=	-0.96841936E 08
A(10,10)=	0.31100186E 09	A(10,11)=	-0.86289104E 08	A(10, 9)=	-0.12686741E 09
A(11,11)=	0.39201152E 09	A(11,12)=	-0.89098464E 08	A(11,10)=	-0.16465389E 09
A(12,12)=	0.69926784E 09	A(12,13)=	-0.15328653E 09	A(12,11)=	-0.16772245E 09
A(13,13)=	0.80363571E 09	A(13,14)=	-0.31646618E 09	A(13,12)=	-0.23216971E 09
A(14,14)=	0.12109588E 10	A(14,15)=	-0.44060954E 09	A(14,13)=	-0.39534925E 09
A(15,15)=	0.13651917E 10	A(15,16)=	-0.35069901E 09	A(15,14)=	-0.51949286E 09
A(16,16)=	0.21093960E 10	A(16,17)=	-0.10123144E 10	A(16,15)=	-0.42958234E 09
A(17,17)=	0.32019016E 10	A(17,18)=	-0.13307044E 10	A(17,16)=	-0.10911977E 10
A(18,18)=	0.37194258E 10	A(18,19)=	-0.15073385E 10	A(18,17)=	-0.14095875E 10
A(19,19)=	0.36371612E 10	A(19,20)=	-0.11209403E 10	A(19,18)=	-0.15862218E 10
A(20,20)=	0.32107914E 10	A(20,21)=	-0.12234683E 10	A(20,19)=	-0.11998234E 10
A(21,21)=	0.34772705E 10			A(21,20)=	-0.13023516E 10

DIAGONAL MATRIX ELEMENTS

B-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
B(1, 1)=	0.74856864E 08	B(1, 2)=	-0.16569040E 07	B(2, 1)=	-0.44856880E 08
B(2, 2)=	0.80141184E 08	B(2, 3)=	-0.16843470E 07	B(3, 2)=	-0.44884320E 08
B(3, 3)=	0.12179539E 09	B(3, 4)=	-0.41383280E 07	B(4, 3)=	-0.47511120E 08
B(4, 4)=	0.18369682E 09	B(4, 5)=	-0.41857280E 07	B(5, 4)=	-0.47558512E 08
B(5, 5)=	0.17176107E 09	B(5, 6)=	-0.45620800E 06	B(6, 5)=	-0.46075392E 08
B(6, 6)=	0.28417050E 09	B(6, 7)=	-0.10649600E 07	B(7, 6)=	-0.75714544E 08
B(7, 7)=	0.64081613E 09	B(7, 8)=	-0.69323200E 07	B(8, 7)=	-0.84951504E 08
B(8, 8)=	0.43377408E 09	B(8, 9)=	-0.18822752E 08	B(9, 8)=	-0.96841936E 08
B(9, 9)=	0.57228979E 09	B(9,10)=	-0.48848224E 08	B(10, 9)=	-0.12686741E 09
B(10,10)=	0.49950182E 09	B(10,11)=	-0.86289104E 08	B(11,10)=	-0.16465389E 09
B(11,11)=	0.61281126E 09	B(11,12)=	-0.89098664E 08	B(12,11)=	-0.16772245E 09
B(12,12)=	0.13292677E 10	B(12,13)=	-0.15328653E 09	B(13,12)=	-0.23216971E 09
B(13,13)=	0.10586358E 10	B(13,14)=	-0.31646618E 09	B(14,13)=	-0.39534925E 09
B(14,14)=	0.18609587E 10	B(14,15)=	-0.44060954E 09	B(15,14)=	-0.51949286E 09
B(15,15)=	0.21241917E 10	B(15,16)=	-0.35069901E 09	B(16,15)=	-0.42958234E 09
B(16,16)=	0.30438953E 10	B(16,17)=	-0.10123144E 10	B(17,16)=	-0.10911977E 10
B(17,17)=	0.42939013E 10	B(17,18)=	-0.13307044E 10	B(18,17)=	-0.14095875E 10
B(18,18)=	0.48429220E 10	B(18,19)=	-0.15073385E 10	B(19,18)=	-0.15862218E 10
B(19,19)=	0.49391575E 10	B(19,20)=	-0.11209403E 10	B(20,19)=	-0.11998234E 10
B(20,20)=	0.43132887E 10	B(20,21)=	-0.12234683E 10	B(21,20)=	-0.13023516E 10
B(21,21)=	0.48422666E 10				

I	J	1	2	3	4	5
1		0.26880286E-11	0.10999611E-12	0.25676213E-14	0.10969013E-15	0.41992287E-17
2		0.28806662E-11	0.25668287E-11	0.74241557E-13	0.33846547E-14	0.13381078E-15
3		0.14886582E-11	0.17210781E-11	0.14221376E-11	0.81305242E-13	0.35213711E-14
4		0.50674666E-12	0.66695531E-12	0.76847090E-12	0.84081998E-12	0.48261091E-13
5		0.19116994E-12	0.27801530E-12	0.38250707E-12	0.58199268E-12	0.81846238E-12
6		0.40212215E-13	0.61992403E-13	0.92777023E-13	0.15764272E-12	0.27860928E-12
7		0.63425285E-14	0.10243285E-13	0.16265567E-13	0.29531563E-13	0.58048889E-13
8		0.22806820E-14	0.39107443E-14	0.66463423E-14	0.12899516E-13	0.27765361E-13
9		0.72417484E-15	0.12816909E-14	0.22503978E-14	0.44962881E-14	0.10026183E-13
10		0.37568643E-15	0.67699024E-15	0.12098072E-14	0.24536787E-14	0.55673477E-14
11		0.16458227E-15	0.29867504E-15	0.53734923E-15	0.10959418E-14	0.25025120E-14
12		0.29057373E-16	0.52895699E-16	0.95444983E-16	0.19513417E-15	0.44678892E-15
13		0.10332497E-16	0.18863702E-16	0.34130610E-16	0.69934958E-16	0.16052802E-15
14		0.31000992E-17	0.56676703E-17	0.10268095E-16	0.21062162E-16	0.48403539E-16
15		0.10292873E-17	0.18837169E-17	0.34160301E-17	0.70125899E-17	0.16129943E-16
16		0.21291712E-18	0.38997244E-18	0.70771919E-18	0.14537104E-17	0.33459845E-17
17		0.76760241E-19	0.14066496E-18	0.25540194E-18	0.52482345E-18	0.12085059E-17
18		0.32151580E-19	0.58943081E-19	0.10706328E-18	0.22007331E-18	0.50694012E-18
19		0.14304832E-19	0.26233626E-19	0.47665045E-19	0.98001877E-19	0.22581064E-18
20		0.58731342E-20	0.10774005E-19	0.19581317E-19	0.40269511E-19	0.92810337E-19
21		0.20202925E-20	0.37068128E-20	0.67381196E-20	0.13859030E-19	0.31946197E-19

I	J	6	7	8	9	10
1		0.12822592E-19	0.69793124E-22	0.24860983E-23	0.19403099E-24	0.34803511E-25
2		0.41343935E-18	0.22564952E-20	0.80478542E-22	0.62838703E-23	0.11273990E-23
3		0.11219668E-16	0.61661869E-19	0.22061073E-20	0.17244988E-21	0.30957388E-22
4		0.16572709E-15	0.92538598E-18	0.33342458E-19	0.26129196E-20	0.46966229E-21
5		0.34086810E-14	0.19709464E-16	0.72085906E-18	0.56788431E-19	0.10234829E-19
6		0.36756308E-12	0.24668047E-14	0.95445803E-16	0.76621583E-17	0.13939747E-17
7		0.10658369E-12	0.12854848E-12	0.66586988E-14	0.57814742E-15	0.10908658E-15
8		0.62076863E-13	0.10884447E-12	0.19734800E-12	0.20840792E-13	0.42390713E-14
9		0.23880918E-13	0.45554970E-13	0.96890215E-13	0.13301957E-12	0.35413689E-13
10		0.13650180E-13	0.26958308E-13	0.60617310E-13	0.10724077E-12	0.15375104E-12
11		0.61989056E-14	0.12387359E-13	0.28353015E-13	0.53618761E-13	0.90861184E-13
12		0.11115435E-14	0.22321326E-14	0.51462300E-14	0.99851903E-14	0.17878338E-13
13		0.40095427E-15	0.80875405E-15	0.18767489E-14	0.37234586E-14	0.69693397E-14
14		0.12112619E-15	0.24483127E-15	0.56986873E-15	0.11422076E-14	0.21797114E-14
15		0.40419790E-16	0.81825818E-16	0.19087940E-15	0.38541037E-15	0.74557513E-15
16		0.83934521E-17	0.17011399E-16	0.39749814E-16	0.80703380E-16	0.15769146E-15
17		0.30336369E-17	0.61530971E-17	0.14393326E-16	0.29327020E-16	0.57672197E-16
18		0.12732394E-17	0.25840692E-17	0.60499312E-17	0.12362065E-16	0.24433393E-16
19		0.56739704E-18	0.11520955E-17	0.26991846E-17	0.55276535E-17	0.10968409E-16
20		0.23329802E-18	0.47391798E-18	0.11110111E-17	0.22798545E-17	0.45400048E-17
21		0.80322495E-19	0.16320853E-18	0.38275508E-18	0.78638556E-18	0.15692907E-17

I	J	11	12	13	14	15
1		0.81424990E-26	0.11211938E-26	0.25188544E-27	0.77280455E-28	0.26696555E-28
2		0.26378897E-24	0.36323895E-25	0.81606336E-26	0.25037634E-26	0.86492898E-27
3		0.72452220E-23	0.99774102E-24	0.22416769E-24	0.68777923E-25	0.23759739E-25
4		0.10998020E-21	0.15147896E-22	0.34037281E-23	0.10443580E-23	0.36078721E-24
5		0.23994379E-20	0.33059416E-21	0.74301218E-22	0.22799708E-22	0.78767888E-23
6		0.32811758E-18	0.45261627E-19	0.10180545E-19	0.31249365E-20	0.10797506E-20
7		0.26067015E-16	0.36115615E-17	0.81470042E-18	0.25035903E-18	0.86552509E-19
8		0.10425104E-14	0.14561727E-15	0.33023935E-16	0.10169535E-16	0.35192118E-17
9		0.94559811E-14	0.13497419E-14	0.31037659E-15	0.96092050E-16	0.33336768E-16
10		0.49601206E-13	0.73850736E-14	0.17423205E-14	0.54463837E-15	0.18979699E-15
11		0.98480740E-13	0.16705865E-13	0.42244718E-14	0.13532266E-14	0.47682703E-15
12		0.23383947E-13	0.23833339E-13	0.84434582E-14	0.29648931E-14	0.10855373E-14
13		0.10313449E-13	0.15434146E-13	0.29741583E-13	0.12309161E-13	0.47737083E-14
14		0.33839148E-14	0.56390202E-14	0.12797448E-13	0.14304025E-13	0.66409958E-14
15		0.11949405E-14	0.21209788E-14	0.52046143E-14	0.73667133E-14	0.92557696E-14
16		0.25848947E-15	0.47811579E-15	0.12279047E-14	0.19382369E-14	0.30308222E-14
17		0.95873330E-16	0.18171340E-15	0.47858314E-15	0.79710480E-15	0.13575545E-14
18		0.41061709E-16	0.79261995E-16	0.21256154E-15	0.36702467E-15	0.65792352E-15
19		0.18587569E-16	0.36374043E-16	0.98833313E-16	0.17496666E-15	0.32415845E-15
20		0.77513631E-17	0.15351519E-16	0.42181817E-16	0.76228995E-16	0.14492319E-15
21		0.26911329E-17	0.53669447E-17	0.14841248E-16	0.27129009E-16	0.52295417E-16

I \ J	16	17	18	19	20
1	0.55753069E-29	0.21976230E-29	0.98795692E-30	0.47297666E-30	0.19261213E-30
2	0.18063201E-27	0.71200041E-28	0.32008486E-28	0.15323722E-28	0.62403764E-29
3	0.49619875E-26	0.19558891E-26	0.87928601E-27	0.42094858E-27	0.17142575E-27
4	0.75347754E-25	0.29700259E-25	0.13352029E-25	0.63921522E-26	0.26031223E-26
5	0.16450440E-23	0.64844297E-24	0.29151536E-24	0.13956044E-24	0.56834076E-25
6	0.22551920E-21	0.88898200E-22	0.39966028E-22	0.19132651E-22	0.77920391E-23
7	0.18082617E-19	0.71288784E-20	0.32051837E-20	0.15345491E-20	0.62485232E-21
8	0.73560045E-18	0.29006784E-18	0.13043310E-18	0.62452705E-19	0.25435862E-19
9	0.69770054E-17	0.27527934E-17	0.12382546E-17	0.59301617E-18	0.24156254E-18
10	0.39811118E-16	0.15723314E-16	0.70769322E-17	0.33904711E-17	0.13814818E-17
11	0.10056644E-15	0.39815856E-16	0.17946855E-16	0.86058630E-17	0.35089366E-17
12	0.23316234E-15	0.93056337E-16	0.42144693E-16	0.20267725E-16	0.82821277E-17
13	0.10518860E-14	0.42440438E-15	0.19343584E-15	0.93382694E-16	0.38270040E-16
14	0.15659670E-14	0.64913683E-15	0.30043285E-15	0.14636246E-15	0.60390577E-16
15	0.26399728E-14	0.11664673E-14	0.55838402E-15	0.27732155E-15	0.11604120E-15
16	0.46500381E-14	0.25480765E-14	0.13386350E-14	0.69768113E-15	0.30176819E-15
17	0.26503676E-14	0.31416912E-14	0.19786599E-14	0.11138709E-14	0.50535828E-15
18	0.14384701E-14	0.20653829E-14	0.25974403E-14	0.17345386E-14	0.85887214E-15
19	0.75558494E-15	0.11827504E-14	0.17782466E-14	0.22731664E-14	0.13673113E-14
20	0.35372879E-15	0.58491204E-15	0.96445628E-15	0.14984758E-14	0.23402184E-14
21	0.13066298E-15	0.22170995E-15	0.38015601E-15	0.63216441E-15	0.11723262E-14

I	J	21
1		0.67769882E-31
2		0.21956572E-29
3		0.60315672E-28
4		0.91590256E-27
5		0.19997094E-25
6		0.27416261E-23
7		0.21989252E-21
8		0.89500361E-20
9		0.85004854E-19
10		0.48621123E-18
11		0.12353992E-17
12		0.29192230E-17
13		0.13509328E-16
14		0.21391963E-16
15		0.41396260E-16
16		0.10940096E-15
17		0.18726414E-15
18		0.33005676E-15
19		0.56177089E-15
20		0.11394944E-14
21		0.14477343E-14

SECTION H - SAMPLE INPUT & OUTPUT

VD $\alpha B^{-1}A^{-1}$

IMAT = 3

INDEX(6) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 3
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 0 ALPHA A MATRIX INVERSE
INDEX(2)= 0 ALPHA A MATRIX INVERSE L
INDEX(3)= 0 ALPHA B MATRIX INVERSE
INDEX(4)= 0 ALPHA B MATRIX INVERSE F
INDEX(5)= 0 ALPHA B A MATRIX INVERSE
INDEX(6)= 1 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 0 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 0 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFP = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11880.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
				0 - 1	0.0	0.500000E 03
1	20.000	0.0	0.0	1 - 2	0.500000E-01	0.500000E 03
2	20.000	0.0	-0.700000E 03	2 - 3	0.100000E 00	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	3 - 4	0.150000E 00	0.502000E 03
4	20.000	0.0	-0.168000E 05	4 - 5	0.200000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	5 - 6	0.250000E 00	0.528000E 03
6	20.000	0.457200E 04	-0.372000E 05	6 - 7	0.350000E 00	0.864000E 03
7	20.000	0.0	-0.604000E 05	7 - 8	0.450000E 00	0.903000E 03
8	20.000	0.0	-0.380000E 05	8 - 9	0.550000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	9 - 10	0.650000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	10 - 11	0.750000E 00	0.907000E 03
11	20.000	0.230000E 02	-0.303000E 05	11 - 12	0.900000E 00	0.910000E 03
12	20.000	0.0	-0.682000E 05	12 - 13	0.120000E 01	0.913000E 03
13	20.000	0.0	-0.321000E 05	13 - 14	0.150000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	14 - 15	0.195000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	15 - 16	0.280000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	16 - 17	0.390000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	17 - 18	0.530000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	18 - 19	0.600000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	19 - 20	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	20 - 21	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	F (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.746496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479984E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

A-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
A(1, 1)=	0.82356864E 08	A(1, 2)=	-0.16569040E 07	A(2, 1)=	-0.44856880E 08
A(2, 2)=	0.82541184E 08	A(2, 3)=	-0.16843470E 07	A(3, 2)=	-0.44884320E 08
A(3, 3)=	0.98695408E 08	A(3, 4)=	-0.41383280E 07	A(4, 3)=	-0.47511120E 08
A(4, 4)=	0.11169682E 09	A(4, 5)=	-0.41857280E 07	A(5, 4)=	-0.47585120E 08
A(5, 5)=	0.11776109E 09	A(5, 6)=	-0.45620800E 06	A(6, 5)=	-0.46075392E 08
A(6, 6)=	0.15417074E 09	A(6, 7)=	-0.10649600E 07	A(7, 6)=	-0.75714544E 08
A(7, 7)=	0.20001643E 09	A(7, 8)=	-0.69323200E 07	A(8, 7)=	-0.84951504E 08
A(8, 8)=	0.20277424E 09	A(8, 9)=	-0.18822752E 08	A(9, 8)=	-0.96841936E 08
A(9, 9)=	0.26419011E 09	A(9,10)=	-0.48848224E 08	A(10, 9)=	-0.12686741E 09
A(10,10)=	0.31100186E 09	A(10,11)=	-0.86289104E 08	A(11,10)=	-0.14465389E 09
A(11,11)=	0.39201152E 09	A(11,12)=	-0.89098464E 08	A(12,11)=	-0.16772245E 09
A(12,12)=	0.69926784E 09	A(12,13)=	-0.15328653E 09	A(13,12)=	-0.23216971E 09
A(13,13)=	0.80363571E 09	A(13,14)=	-0.31646618E 09	A(14,13)=	-0.39534925E 09
A(14,14)=	0.12109588E 10	A(14,15)=	-0.44060954E 09	A(15,14)=	-0.51949286E 09
A(15,15)=	0.13651917E 10	A(15,16)=	-0.35089901E 09	A(16,15)=	-0.42958234E 09
A(16,16)=	0.21093960E 10	A(16,17)=	-0.10123144E 10	A(17,16)=	-0.10911977E 10
A(17,17)=	0.32019016E 10	A(17,18)=	-0.13307044E 10	A(18,17)=	-0.14095875E 10
A(18,18)=	0.37194258E 10	A(18,19)=	-0.15073385E 10	A(19,18)=	-0.15862218E 10
A(19,19)=	0.36371612E 10	A(19,20)=	-0.11209403E 10	A(20,19)=	-0.11998234E 10
A(20,20)=	0.32107914E 10	A(20,21)=	-0.12234683E 10	A(21,20)=	-0.13023516E 10
A(21,21)=	0.34772705E 10				

DIAGONAL MATRIX ELEMENTS

B-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
B(1, 1)=	0.74856864E 08	B(1, 2)=	-0.16569040E 07	B(2, 1)=	-0.44856880E 08
B(2, 2)=	0.80141184E 08	B(2, 3)=	-0.16843470E 07	B(3, 2)=	-0.44884320E 08
B(3, 3)=	0.12179539E 09	B(3, 4)=	-0.41383280E 07	B(4, 3)=	-0.47511120E 08
B(4, 4)=	0.18369682E 09	B(4, 5)=	-0.41857280E 07	B(5, 4)=	-0.47558512E 08
B(5, 5)=	0.17176107E 09	B(5, 6)=	-0.45620800E 06	B(6, 5)=	-0.46075392E 08
B(6, 6)=	0.28417050E 09	B(6, 7)=	-0.10649600E 07	B(7, 6)=	-0.75714544E 08
B(7, 7)=	0.64081613E 09	B(7, 8)=	-0.69323200E 07	B(8, 7)=	-0.84951504E 08
B(8, 8)=	0.43377408E 09	B(8, 9)=	-0.18822752E 08	B(9, 8)=	-0.96841936E 08
B(9, 9)=	0.57228979E 09	B(9,10)=	-0.48848224E 08	B(10, 9)=	-0.12686741E 09
B(10,10)=	0.49950182E 09	B(10,11)=	-0.86289104E 08	B(11,10)=	-0.16465389E 09
B(11,11)=	0.61281126E 09	B(11,12)=	-0.89098464E 08	B(12,11)=	-0.16772245E 09
B(12,12)=	0.13292677E 10	B(12,13)=	-0.15328653E 09	B(13,12)=	-0.23216971E 09
B(13,13)=	0.10586358E 10	B(13,14)=	-0.31646618E 09	B(14,13)=	-0.39534925E 09
B(14,14)=	0.18609587E 10	B(14,15)=	-0.44060954E 09	B(15,14)=	-0.51949286E 09
B(15,15)=	0.21241917E 10	B(15,16)=	-0.35069901E 09	B(16,15)=	-0.42958234E 09
B(16,16)=	0.30438953E 10	B(16,17)=	-0.10123144E 10	B(17,16)=	-0.10911977E 10
B(17,17)=	0.42939013E 10	B(17,18)=	-0.13307044E 10	B(18,17)=	-0.14095875E 10
B(18,18)=	0.48429220E 10	B(18,19)=	-0.15073385E 10	B(19,18)=	-0.15862218E 10
B(19,19)=	0.49391575E 10	B(19,20)=	-0.11209403E 10	B(20,19)=	-0.11998234E 10
B(20,20)=	0.43132887E 10	B(20,21)=	-0.12234683E 10	B(21,20)=	-0.13023516E 10
B(21,21)=	0.48422666E 10				

I	J	I	2	3	4	5
1		0.10080103E-03	0.39598572E-05	0.12709717E-06	0.63814056E-08	0.28344771E-09
2		0.10802493E-03	0.92405782E-04	0.36749543E-05	0.20307920E-06	0.90322203E-08
3		0.55824654E-04	0.61958781E-04	0.70395763E-04	0.48783131E-05	0.23769240E-06
4		0.19002982E-04	0.24010369E-04	0.38039274E-04	0.50449176E-04	0.3257621BE-05
5		0.71688692E-05	0.10008545E-04	0.18934079E-04	0.34919547E-04	0.5524617E-04
6		0.15079568E-05	0.22317254E-05	0.45924589E-05	0.94585603E-05	0.1880610BE-04
7		0.23784469E-06	0.36875804E-06	0.80514502E-06	0.17718930E-05	0.3918297BE-05
8		0.85525528E-07	0.14078671E-06	0.32899368E-06	0.77397073E-06	0.18741603E-05
9		0.27156542E-07	0.46140848E-07	0.11139457E-06	0.26977716E-06	0.67676709E-06
10		0.14088233E-07	0.24371637E-07	0.59885394E-07	0.14722065E-06	0.37579576E-06
11		0.61718310E-08	0.10752295E-07	0.26598769E-07	0.65756467E-07	0.16891943E-06
12		0.10896508E-08	0.19042441E-08	0.47245230E-08	0.11708046E-07	0.30158237E-07
13		0.38746828E-09	0.67909278E-09	0.16894639E-08	0.41960959E-08	0.10835635E-07
14		0.11625366E-09	0.20403604E-09	0.50827031E-09	0.12637293E-08	0.32672371E-08
15		0.38598250E-10	0.67813768E-10	0.16909338E-09	0.42075521E-09	0.10887704E-08
16		0.79843883E-11	0.14039001E-10	0.35032074E-10	0.87222590E-10	0.22585384E-09
17		0.28785073E-11	0.50639354E-11	0.12642387E-10	0.31489394E-10	0.81574109E-10
18		0.12056831E-11	0.21219493E-11	0.52996288E-11	0.13204395E-10	0.34218434E-10
19		0.53643093E-12	0.94440948E-12	0.23594173E-11	0.58801106E-11	0.15242210E-10
20		0.22024239E-12	0.38786395E-12	0.96927414E-12	0.24161697E-11	0.62646945E-11
21		0.75760904E-13	0.13344518E-12	0.33353669E-12	0.83154154E-12	0.21563671E-11

I	J	6	7	8	9	10
1		0.10001618E-11	0.79564109E-14	0.24612363E-15	0.22992656E-16	0.33933405E-17
2		0.32248260E-10	0.25724036E-12	0.79673715E-14	0.74463831E-15	0.10992134E-15
3		0.87513374E-09	0.70294508E-11	0.21840456E-12	0.20435300E-13	0.30183437E-14
4		0.12926709E-07	0.10549396E-09	0.33009021E-11	0.30963079E-12	0.45792048E-13
5		0.26587702E-06	0.22468782E-08	0.71365025E-10	0.67294260E-11	0.99789449E-12
6		0.28669907E-04	0.28121565E-06	0.94491313E-08	0.90796526E-09	0.13591246E-09
7		0.83135255E-05	0.14654523E-04	0.65921103E-06	0.68510417E-07	0.10635933E-07
8		0.48419943E-05	0.12408265E-04	0.19537445E-04	0.24696319E-05	0.41330924E-06
9		0.18627106E-05	0.51932648E-05	0.95921296E-05	0.15762809E-04	0.24528321E-05
10		0.10647136E-05	0.30732454E-05	0.60011125E-05	0.12708026E-04	0.14990718E-04
11		0.48351450E-06	0.14121579E-05	0.28069480E-05	0.63538200E-05	0.88589604E-05
12		0.86700368E-07	0.25446303E-06	0.50947665E-06	0.11832444E-05	0.17431366E-05
13		0.31274425E-07	0.92197922E-07	0.18579806E-06	0.44122964E-06	0.67951026E-06
14		0.94478381E-08	0.27910755E-07	0.56416994E-07	0.13535151E-06	0.21252174E-06
15		0.31527430E-08	0.93281400E-08	0.18897055E-07	0.45671108E-07	0.72693524E-07
16		0.65468897E-09	0.19392989E-08	0.39352308E-08	0.95633439E-08	0.15374908E-07
17		0.23662361E-09	0.70145267E-09	0.14249391E-08	0.34752503E-08	0.56230363E-08
18		0.99312641E-10	0.29458369E-09	0.59894290E-09	0.14649040E-08	0.23822546E-08
19		0.44256959E-10	0.13133884E-09	0.26721914E-09	0.65502648E-09	0.10694192E-08
20		0.18197235E-10	0.54026630E-10	0.10999007E-09	0.27016256E-09	0.44265014E-09
21		0.62651525E-11	0.18605756E-10	0.37892744E-10	0.93186639E-10	0.15300576E-09

I	J	11	12	13	14	15
1		0.11236645E-17	0.42381111E-18	0.64230730E-19	0.28980153E-19	0.13214789E-19
2		0.36402869E-16	0.13730427E-16	0.20809606E-17	0.93891038E-18	0.42813964E-18
3		0.99984023E-15	0.37714587E-15	0.57162746E-16	0.25791703E-16	0.11761066E-16
4		0.15177262E-13	0.57259021E-14	0.86795043E-15	0.39163394E-15	0.17858959E-15
5		0.33112234E-12	0.12496455E-12	0.18946806E-13	0.85498862E-14	0.38990079E-14
6		0.45280210E-10	0.17108884E-10	0.25960380E-11	0.11718499E-11	0.53447633E-12
7		0.35972472E-08	0.13651698E-08	0.20774857E-09	0.93884581E-10	0.42843465E-10
8		0.14386637E-06	0.55043309E-07	0.84211003E-08	0.38135717E-08	0.17420390E-08
9		0.13049248E-05	0.51020226E-06	0.79145991E-07	0.36034500E-07	0.16501691E-07
10		0.68449644E-05	0.27915567E-05	0.44429163E-06	0.20423926E-06	0.93949438E-07
11		0.13590338E-04	0.63148145E-05	0.10772401E-05	0.50745967E-06	0.23602928E-06
12		0.32269836E-05	0.90089989E-05	0.21530814E-05	0.11118336E-05	0.53734072E-06
13		0.14232555E-05	0.58341047E-05	0.75841017E-05	0.46159321E-05	0.23629846E-05
14		0.46698011E-06	0.21315482E-05	0.32633479E-05	0.53640060E-05	0.32872913E-05
15		0.16490173E-06	0.80172970E-06	0.13271756E-05	0.27625156E-05	0.45816041E-05
16		0.35671537E-07	0.18072768E-06	0.31311561E-06	0.72683844E-06	0.15002561E-05
17		0.13230515E-07	0.68687598E-07	0.12203867E-06	0.29891413E-06	0.67198920E-06
18		0.56665144E-08	0.29961022E-07	0.54203181E-07	0.13763417E-06	0.32567199E-06
19		0.25650837E-08	0.13749382E-07	0.25202489E-07	0.65612426E-07	0.16045834E-06
20		0.10696877E-08	0.58028711E-08	0.10756359E-07	0.28585855E-07	0.71736906E-07
21		0.37137604E-09	0.20287043E-08	0.37845140E-08	0.10173373E-07	0.25886219E-07

I	J	16	17	18	19	20
1		0.37215114E-20	0.17141446E-20	0.79283485E-21	0.43986783E-21	0.15168196E-21
2		0.12057171E-18	0.55535976E-19	0.25686795E-19	0.14251046E-19	0.49142929E-20
3		0.33121230E-17	0.15255924E-17	0.70562663E-18	0.39148178E-18	0.13499769E-18
4		0.50294566E-16	0.23166179E-16	0.10714997E-16	0.59446956E-17	0.20499570E-17
5		0.10980656E-14	0.50578518E-15	0.23394076E-15	0.12979126E-15	0.44756797E-16
6		0.15053388E-12	0.69340529E-13	0.32072720E-13	0.17794275E-13	0.61362252E-14
7		0.12070133E-10	0.55605208E-11	0.25721578E-11	0.14271292E-11	0.49214962E-12
8		0.49101256E-09	0.22625275E-09	0.10467249E-09	0.58080957E-10	0.20030727E-10
9		0.46571458E-08	0.21471773E-08	0.99369868E-09	0.55150440E-09	0.19023037E-09
10		0.26573890E-07	0.12264174E-07	0.56792331E-08	0.31531349E-08	0.10879162E-08
11		0.67127985E-07	0.31056345E-07	0.14402342E-07	0.80034432E-08	0.27632858E-08
12		0.15563563E-06	0.72583873E-07	0.33821099E-07	0.18848965E-07	0.65221712E-08
13		0.70213309E-06	0.33103515E-06	0.15523216E-06	0.86845773E-07	0.30137652E-07
14		0.10452814E-05	0.50632639E-06	0.24109721E-06	0.13611691E-06	0.47557549E-07
15		0.17621796E-05	0.90984383E-06	0.44810292E-06	0.25790877E-06	0.91382333E-07
16		0.31038962E-05	0.19874979E-05	0.10742533E-05	0.64884279E-06	0.23764227E-06
17		0.17691182E-05	0.24505171E-05	0.15878732E-05	0.10359072E-05	0.39796936E-06
18		0.96017720E-06	0.16109971E-05	0.20844445E-05	0.16131189E-05	0.67636137E-06
19		0.50435239E-06	0.92254470E-06	0.14270418E-05	0.21140422E-05	0.10767562E-05
20		0.23611369E-06	0.45623108E-06	0.77397573E-06	0.13935805E-05	0.18429200E-05
21		0.87217416E-07	0.17293360E-06	0.30507499E-06	0.58791233E-06	0.92320630E-06

I	J 21
1	0.66075595E-22
2	0.21407646E-20
3	0.58807734E-19
4	0.89300434E-18
5	0.19497150E-16
6	0.26730842E-14
7	0.21439507E-12
8	0.87262810E-11
9	0.82879689E-10
10	0.47405568E-09
11	0.12045136E-08
12	0.28462410E-08
13	0.13171586E-07
14	0.20857151E-07
15	0.40361332E-07
16	0.10666588E-06
17	0.18258243E-06
18	0.32180515E-06
19	0.54772636E-06
20	0.11110060E-05
21	0.14115394E-05

SECTION I - SAMPLE INPUT & OUTPUT

LVD $\alpha B^{-1}A^{-1}$

IMAT = 3

INDEX(7) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 3
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 0 ALPHA A MATRIX INVERSE F
INDEX(2)= 0 ALPHA A MATRIX INVERSE L
INDEX(3)= 0 ALPHA B MATRIX INVERSE
INDEX(4)= 0 ALPHA B MATRIX INVERSE F
INDEX(5)= 0 ALPHA B A MATRIX INVERSE
INDEX(6)= 0 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 1 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 0 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFP = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11880.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	29300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
				0 - 1	0.0	0.500000E 03
1	20.000	0.0	0.0	1 - 2	0.500000E-01	0.500000E 03
2	20.000	0.0	-0.700000E 03	2 - 3	0.100000E 00	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	3 - 4	0.150000E 00	0.502000E 03
4	20.000	0.0	-0.248000E 05	4 - 5	0.200000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	5 - 6	0.250000E 00	0.528000E 03
6	20.000	0.457200E 04	-0.372000E 05	6 - 7	0.350000E 00	0.864000E 03
7	20.000	0.0	-0.604000E 05	7 - 8	0.450000E 00	0.903000E 03
8	20.000	0.0	-0.380000E 05	8 - 9	0.550000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	9 - 10	0.650000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	10 - 11	0.750000E 00	0.907000E 03
11	20.000	0.230000E 02	-0.303000E 05	11 - 12	0.900000E 00	0.910000E 03
12	20.000	0.0	-0.682000E 05	12 - 13	0.120000E 01	0.913000E 03
13	20.000	0.0	-0.321000E 05	13 - 14	0.150000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	14 - 15	0.195000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	15 - 16	0.280000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	16 - 17	0.390000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	17 - 18	0.530000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	18 - 19	0.600000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	19 - 20	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	20 - 21	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	F (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.370234E 08	0.746496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479994E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

A-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
A(1, 1)=	0.82356864E 08	A(1, 2)=	-0.16569040E 07	A(2, 1)=	-0.44856880E 08
A(2, 2)=	0.82541184E 08	A(2, 3)=	-0.16843470E 07	A(3, 2)=	-0.44884320E 08
A(3, 3)=	0.98695408E 08	A(3, 4)=	-0.41383280E 07	A(4, 3)=	-0.47511120E 08
A(4, 4)=	0.11169682E 09	A(4, 5)=	-0.41857280E 07	A(5, 4)=	-0.47558512E 08
A(5, 5)=	0.11776109E 09	A(5, 6)=	-0.45620800E 06	A(6, 5)=	-0.46075392E 08
A(6, 6)=	0.15417074E 09	A(6, 7)=	-0.10649600E 07	A(7, 6)=	-0.75714544E 08
A(7, 7)=	0.20001643E 09	A(7, 8)=	-0.69323200E 07	A(8, 7)=	-0.84951504E 08
A(8, 8)=	0.20277424E 09	A(8, 9)=	-0.18822752E 08	A(9, 8)=	-0.96841936E 08
A(9, 9)=	0.26419011E 09	A(9,10)=	-0.48848224E 08	A(10, 9)=	-0.12686741E 09
A(10,10)=	0.31100186E 09	A(10,11)=	-0.86289104E 08	A(11,10)=	-0.16465389E 09
A(11,11)=	0.39201152E 09	A(11,12)=	-0.89098464E 08	A(12,11)=	-0.16772245E 09
A(12,12)=	0.69926784E 09	A(12,13)=	-0.15328653E 09	A(13,12)=	-0.23216971E 09
A(13,13)=	0.80363571E 09	A(13,14)=	-0.31646618E 09	A(14,13)=	-0.39534925E 09
A(14,14)=	0.12109588E 10	A(14,15)=	-0.44060954E 09	A(15,14)=	-0.51949286E 09
A(15,15)=	0.13651917E 10	A(15,16)=	-0.35069901E 09	A(16,15)=	-0.42958234E 09
A(16,16)=	0.21093960E 10	A(16,17)=	-0.10123144E 10	A(17,16)=	-0.10911977E 10
A(17,17)=	0.32019016E 10	A(17,18)=	-0.13307044E 10	A(18,17)=	-0.14095875E 10
A(18,18)=	0.37194258E 10	A(18,19)=	-0.15073385E 10	A(19,18)=	-0.15862218E 10
A(19,19)=	0.36371612E 10	A(19,20)=	-0.11209403E 10	A(20,19)=	-0.11998234E 10
A(20,20)=	0.32107914E 10	A(20,21)=	-0.12234683E 10	A(21,20)=	-0.13023516E 10
A(21,21)=	0.34772705E 10				

ALPHA BA INVERSE VDL

SECTION NUMBER NUMBER	FINAL ANSWERS
1	0.848998E-05
2	0.246535E-03
3	0.480383E-02
4	0.652980E-02
5	0.708773E-01
6	0.154674E 00
7	0.429225E-01
8	0.247300E-01
9	0.110817E-01
10	0.865148E-02
11	0.451300E-02
12	0.853267E-03
13	0.322235E-03
14	0.994087E-04
15	0.336782E-04
16	0.707312E-05
17	0.257525E-05
18	0.108718E-05
19	0.486707E-06
20	0.200956E-06
21	0.693598E-07

DIAGONAL MATRIX ELEMENTS

B-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
B(1, 1)=	0.74856864E 08	B(1, 2)=	-0.16569040E 07		
B(2, 2)=	0.80141184E 08	B(2, 3)=	-0.16843470E 07	B(2, 1)=	-0.44856880E 08
B(3, 3)=	0.12179539E 09	B(3, 4)=	-0.41383280E 07	B(3, 2)=	-0.44884320E 08
B(4, 4)=	0.18369682E 09	B(4, 5)=	-0.41857280E 07	B(4, 3)=	-0.47511120E 08
B(5, 5)=	0.17176107E 09	B(5, 6)=	-0.45620800E 06	B(5, 4)=	-0.47558512E 08
B(6, 6)=	0.28417050E 09	B(6, 7)=	-0.10649600E 07	B(6, 5)=	-0.46075392E 08
B(7, 7)=	0.64081613E 09	B(7, 8)=	-0.69323200E 07	B(7, 6)=	-0.75714544E 08
B(8, 8)=	0.43377408E 09	B(8, 9)=	-0.18822752E 08	B(8, 7)=	-0.84951504E 08
B(9, 9)=	0.57228979E 09	B(9,10)=	-0.48848224E 08	B(9, 8)=	-0.96841936E 08
B(10,10)=	0.49950182E 09	B(10,11)=	-0.86289104E 08	B(10, 9)=	-0.12686741E 09
B(11,11)=	0.61281126E 09	B(11,12)=	-0.89098464E 08	B(11,10)=	-0.16465389E 09
B(12,12)=	0.13292677E 10	B(12,13)=	-0.15328653E 09	B(12,11)=	-0.16772245E 09
B(13,13)=	0.10586358E 10	B(13,14)=	-0.31646618E 09	B(13,12)=	-0.23216971E 09
B(14,14)=	0.18609587E 10	B(14,15)=	-0.44060954E 09	B(14,13)=	-0.39534975E 09
B(15,15)=	0.21241917E 10	B(15,16)=	-0.35069901E 09	B(15,14)=	-0.51949286E 09
B(16,16)=	0.30438953E 10	B(16,17)=	-0.10123144E 10	B(16,15)=	-0.42958234E 09
B(17,17)=	0.42939013E 10	B(17,18)=	-0.13307044E 10	B(17,16)=	-0.10911977E 10
B(18,18)=	0.48429220E 10	B(18,19)=	-0.15073385E 10	B(18,17)=	-0.14095875E 10
B(19,19)=	0.49391575E 10	B(19,20)=	-0.11209403E 10	B(19,18)=	-0.15862218E 10
B(20,20)=	0.43132887E 10	B(20,21)=	-0.12234683E 10	B(20,19)=	-0.11998234E 10
B(21,21)=	0.48422666E 10			B(21,20)=	-0.13023516E 10

SECTION J - SAMPLE INPUT & OUTPUT

$D.O._{SAT.} + FB^{-1} - LVD\ \alpha B^{-1}A^{-1}$

IMAT = 3

INDEX(8) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 3
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 0 ALPHA A MATRIX INVERSE
INDEX(2)= 0 ALPHA A MATRIX INVERSE L
INDEX(3)= 0 ALPHA B MATRIX INVERSE
INDEX(4)= 0 ALPHA B MATRIX INVERSE F
INDEX(5)= 0 ALPHA B A MATRIX INVERSE
INDEX(6)= 0 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 0 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 1 DISOXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFP = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		
1 - 2	30000.	1		14203.2
2 - 3	24300.	2	0.250000E 09	14203.2
3 - 4	28950.	3	0.240000E 09	11035.2
4 - 5	34260.	4	0.330000E 09	9240.0
5 - 6	32700.	5	0.400000E 09	6916.8
6 - 7	47640.	6	0.450000E 09	9873.6
7 - 8	49860.	7	0.520000E 09	11140.8
8 - 9	43620.	8	0.760000E 09	13569.6
9 - 10	58980.	9	0.660000E 09	11563.2
10 - 11	66480.	10	0.790000E 09	12893.2
11 - 12	84900.	11	0.650000E 09	10876.8
12 - 13	110670.	12	0.920000E 09	11880.0
13 - 14	129750.	13	0.252000E 10	20856.0
14 - 15	171090.	14	0.170000E 10	15523.2
15 - 16	116730.	15	0.250000E 10	15470.4
16 - 17	221526.	16	0.330000E 10	23284.8
17 - 18	220200.	17	0.445000E 10	22492.8
18 - 19	242520.	18	0.520000E 10	23337.6
19 - 20	193920.	19	0.535000E 10	24129.6
20 - 21	216960.	20	0.620000E 10	28300.8
21 - 22	222600.	21	0.525000E 10	27456.0
		22	0.650000E 10	30043.2
				30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
1	20.000	0.0	0.0	0 - 1	0.0	0.500000E 03
2	20.000	0.0	-0.700000E 03	1 - 2	0.500000E-01	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	2 - 3	0.100000E 00	0.500000E 03
4	20.000	0.0	-0.248000E 05	3 - 4	0.150000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	4 - 5	0.200000E 00	0.502000E 03
6	20.000	0.457200E 04	-0.372000E 05	5 - 6	0.250000E 00	0.528000E 03
7	20.000	0.0	-0.604000E 05	6 - 7	0.350000E 00	0.864000E 03
8	20.000	0.0	-0.380000E 05	7 - 8	0.450000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	8 - 9	0.550000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	9 - 10	0.650000E 00	0.903000E 03
11	20.000	0.230000E 02	-0.303000E 05	10 - 11	0.750000E 00	0.907000E 03
12	20.000	0.0	-0.682000E 05	11 - 12	0.900000E 00	0.910000E 03
13	20.000	0.0	-0.321000E 05	12 - 13	0.120000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	13 - 14	0.150000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	14 - 15	0.195000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	15 - 16	0.280000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	16 - 17	0.390000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	17 - 18	0.530000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	18 - 19	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	19 - 20	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	20 - 21	0.600000E 01	0.913000E 03
				21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	E (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.746496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479984E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

A-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
A(1, 1)=	0.82356864E 08	A(1, 2)=	-0.16569040E 07	A(2, 1)=	-0.44856880E 08
A(2, 2)=	0.82541184E 08	A(2, 3)=	-0.16843470E 07	A(3, 2)=	-0.44884320E 08
A(3, 3)=	0.98695408E 08	A(3, 4)=	-0.41383280E 07	A(4, 3)=	-0.47511120E 08
A(4, 4)=	0.11169682E 09	A(4, 5)=	-0.41857280E 07	A(5, 4)=	-0.47558512E 08
A(5, 5)=	0.11776109E 09	A(5, 6)=	-0.45620800E 06	A(6, 5)=	-0.46075392E 08
A(6, 6)=	0.15417074E 09	A(6, 7)=	-0.10649600E 07	A(7, 6)=	-0.75714544E 08
A(7, 7)=	0.20001643E 09	A(7, 8)=	-0.69323200E 07	A(8, 7)=	-0.84951504E 08
A(8, 8)=	0.20277424E 09	A(8, 9)=	-0.18822752E 08	A(9, 8)=	-0.96841936E 08
A(9, 9)=	0.26419011E 09	A(9,10)=	-0.48848224E 08	A(10, 9)=	-0.12686741E 09
A(10,10)=	0.31100186E 09	A(10,11)=	-0.86289104E 08	A(11,10)=	-0.16465389E 09
A(11,11)=	0.39201152E 09	A(11,12)=	-0.89098464E 08	A(12,11)=	-0.16772245E 09
A(12,12)=	0.69926784E 09	A(12,13)=	-0.15328653E 09	A(13,12)=	-0.23216971E 09
A(13,13)=	0.80363571E 09	A(13,14)=	-0.31646618E 09	A(14,13)=	-0.39534925E 09
A(14,14)=	0.12109588E 10	A(14,15)=	-0.44060954E 09	A(15,14)=	-0.51949286E 09
A(15,15)=	0.13651917E 10	A(15,16)=	-0.35069901E 09	A(16,15)=	-0.42958234E 09
A(16,16)=	0.21093960E 10	A(16,17)=	-0.10123144E 10	A(17,16)=	-0.10911977E 10
A(17,17)=	0.32019016E 10	A(17,18)=	-0.13307044E 10	A(18,17)=	-0.14095875E 10
A(18,18)=	0.37194258E 10	A(18,19)=	-0.15073385E 10	A(19,18)=	-0.15862218E 10
A(19,19)=	0.36371612E 10	A(19,20)=	-0.11209403E 10	A(20,19)=	-0.11998234E 10
A(20,20)=	0.32107914E 10	A(20,21)=	-0.12234683E 10	A(21,20)=	-0.13023516E 10
A(21,21)=	0.34772705E 10				

DIAGONAL MATRIX ELEMENTS

B-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
B(1, 1)=	0.74856864E 08	B(1, 2)=	-0.16569040E 07	B(2, 1)=	-0.44856880E 08
B(2, 2)=	0.80141184E 08	B(2, 3)=	-0.16843470E 07	B(3, 2)=	-0.44884320E 08
B(3, 3)=	0.12179539E 09	B(3, 4)=	-0.41383280E 07	B(4, 3)=	-0.47511120E 08
B(4, 4)=	0.18369682E 09	B(4, 5)=	-0.41857280E 07	B(5, 4)=	-0.47558512E 08
B(5, 5)=	0.17176107E 09	B(5, 6)=	-0.45620800E 06	B(6, 5)=	-0.46075392E 08
B(6, 6)=	0.28417050E 09	B(6, 7)=	-0.10649600E 07	B(7, 6)=	-0.75714544E 08
B(7, 7)=	0.64081613E 09	B(7, 8)=	-0.69323200E 07	B(8, 7)=	-0.84951504E 08
B(8, 8)=	0.43377408E 09	B(8, 9)=	-0.18822752E 08	B(9, 8)=	-0.96841936E 08
B(9, 9)=	0.57228979E 09	B(9,10)=	-0.48848224E 08	B(10, 9)=	-0.12686741E 09
B(10,10)=	0.49950182E 09	B(10,11)=	-0.86289104E 08	B(11,10)=	-0.16465389E 09
B(11,11)=	0.61281126E 09	B(11,12)=	-0.89098464E 08	B(12,11)=	-0.16772245E 09
B(12,12)=	0.13292677E 10	B(12,13)=	-0.15328653E 09	B(13,12)=	-0.23216971E 09
B(13,13)=	0.10586358E 10	B(13,14)=	-0.31646618E 09	B(14,13)=	-0.39534925E 09
B(14,14)=	0.18609587E 10	B(14,15)=	-0.44060954E 09	B(15,14)=	-0.51949286E 09
B(15,15)=	0.21241917E 10	B(15,16)=	-0.35069901E 09	B(16,15)=	-0.42958234E 09
B(16,16)=	0.30438953E 10	B(16,17)=	-0.10123144E 10	B(17,16)=	-0.10911977E 10
B(17,17)=	0.42939013E 10	B(17,18)=	-0.13307044E 10	B(18,17)=	-0.14095875E 10
B(18,18)=	0.48429220E 10	B(18,19)=	-0.15073385E 10	B(19,18)=	-0.15862218E 10
B(19,19)=	0.49391575E 10	B(19,20)=	-0.11209403E 10	B(20,19)=	-0.11998234E 10
B(20,20)=	0.43132887E 10	B(20,21)=	-0.12234683E 10	B(21,20)=	-0.13023516E 10
B(21,21)=	0.48422666E 10				

D.O.SATURATION + ALPHA B INVERSE F - ALPHA B A INVERSE V D L

SECTION NUMBER	FINAL ANSWERS
1	0.776615E 01
2	0.759620E 01
3	0.625913E 01
4	0.514348E 01
5	0.461001E 01
6	0.501306E 01
7	0.589173E 01
8	0.591427E 01
9	0.614766E 01
10	0.620570E 01
11	0.639528E 01
12	0.666097E 01
13	0.677774E 01
14	0.688762E 01
15	0.682918E 01
16	0.694171E 01
17	0.696366E 01
18	0.698478E 01
19	0.718157E 01
20	0.714336E 01
21	0.727038E 01

STEADY STATE TEST CASE 10

9/20/67

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11880.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	15470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28300.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

SECTION K - SAMPLE INPUT & OUTPUT

(COMPOSITE OUTPUT)

IMAT = 3

INDEX(1) through INDEX(8) = 1

PROGRAM CASE CONTROL

NUMBER OF ESTUARINE SECTIONS= 21

MATRIX CASE BEING CONSIDERED=IMAT= 3
WHERE= IMAT=1 A MATRIX
IMAT=2 B MATRIX
IMAT=3 A AND B MATRIX

PRINTING INDEX OPTIONS IF INDEX(N)=1
FOR THIS CASE INDEX(1)= 1 ALPHA A MATRIX INVERSE
INDEX(2)= 1 ALPHA A MATRIX INVERSE L
INDEX(3)= 1 ALPHA B MATRIX INVERSE
INDEX(4)= 1 ALPHA B MATRIX INVERSE F
INDEX(5)= 1 ALPHA B A MATRIX INVERSE
INDEX(6)= 1 ALPHA B A MATRIX INVERSE TIMES ELEMENTS VD(I) FORMED ON MATRIX COLUMNS
INDEX(7)= 1 ALPHA B A MATRIX INVERSE V D L
INDEX(8)= 1 DISPXS + ALPHA B MATRIX INVERSE F - ALPHA B A MATRIX INVERSE V D L

CONVERSION FACTORS USED ON INPUT VARIABLES
CFQ = 1.00
CFLEN = 1.00
CFK = 1.00
CFL = 1.00
CFAREA = 1.00
CFVOL = 1.00
CFD = 1.00

GEOMETRIC INPUT DATA

INTERFACE NUMBER	AREA (SQ.FT)	SECTION NUMBER	VOLUME (CU.FT.)	LENGTH (FT.)
0 - 1	4605.	0		14203.2
1 - 2	30000.	1	0.250000E 09	14203.2
2 - 3	24300.	2	0.240000E 09	11035.2
3 - 4	28950.	3	0.330000E 09	9240.0
4 - 5	34260.	4	0.400000E 09	6916.8
5 - 6	32700.	5	0.450000E 09	9873.6
6 - 7	47640.	6	0.520000E 09	11140.8
7 - 8	49860.	7	0.760000E 09	13569.6
8 - 9	43620.	8	0.660000E 09	11563.2
9 - 10	58980.	9	0.790000E 09	12883.2
10 - 11	66480.	10	0.650000E 09	10876.8
11 - 12	84900.	11	0.920000E 09	11890.0
12 - 13	110670.	12	0.252000E 10	20856.0
13 - 14	129750.	13	0.170000E 10	15523.2
14 - 15	171090.	14	0.250000E 10	16470.4
15 - 16	116730.	15	0.330000E 10	23284.8
16 - 17	221526.	16	0.445000E 10	22492.8
17 - 18	220200.	17	0.520000E 10	23337.6
18 - 19	242520.	18	0.535000E 10	24129.6
19 - 20	193920.	19	0.620000E 10	28900.8
20 - 21	216960.	20	0.525000E 10	27456.0
21 - 22	222600.	21	0.650000E 10	30043.2
		22		30043.2

HYDRAULIC AND LOAD INPUT DATA

SECTION NUMBER	T (DEG C)	J (LBS/DAY)	P (LBS/DAY)	INTERFACE NUMBER	K (SQ.MI/DAY)	Q (CU.FT/SEC)
				0 - 1	0.0	0.500000E 03
1	20.000	0.0	0.0	1 - 2	0.500000E-01	0.500000E 03
2	20.000	0.0	-0.700000E 03	2 - 3	0.100000E 00	0.500000E 03
3	20.000	0.640000E 02	-0.103000E 05	3 - 4	0.150000E 00	0.502000E 03
4	20.000	0.0	-0.248000E 05	4 - 5	0.200000E 00	0.502000E 03
5	20.000	0.123900E 04	-0.253000E 05	5 - 6	0.250000E 00	0.528000E 03
6	20.000	0.457200E 04	-0.372000E 05	6 - 7	0.350000E 00	0.864000E 03
7	20.000	0.0	-0.604000E 05	7 - 8	0.450000E 00	0.903000E 03
8	20.000	0.0	-0.380000E 05	8 - 9	0.550000E 00	0.903000E 03
9	20.000	0.750000E 02	-0.418000E 05	9 - 10	0.650000E 00	0.903000E 03
10	20.000	0.147000E 03	-0.284000E 05	10 - 11	0.750000E 00	0.907000E 03
11	20.000	0.230000E 02	-0.303000E 05	11 - 12	0.900000E 00	0.910000E 03
12	20.000	0.0	-0.682000E 05	12 - 13	0.120000E 01	0.913000E 03
13	20.000	0.0	-0.321000E 05	13 - 14	0.150000E 01	0.913000E 03
14	20.000	0.0	-0.522000E 05	14 - 15	0.195000E 01	0.913000E 03
15	20.000	0.0	-0.781000E 05	15 - 16	0.280000E 01	0.913000E 03
16	20.000	0.0	-0.813000E 05	16 - 17	0.390000E 01	0.913000E 03
17	20.000	0.0	-0.946000E 05	17 - 18	0.530000E 01	0.913000E 03
18	20.000	0.0	-0.111200E 06	18 - 19	0.600000E 01	0.913000E 03
19	20.000	0.0	-0.599000E 05	19 - 20	0.600000E 01	0.913000E 03
20	20.000	0.0	-0.866000E 05	20 - 21	0.600000E 01	0.913000E 03
21	20.000	0.0	-0.100200E 06	21 - 22	0.600000E 01	0.913000E 03

COMPUTED SYSTEM PARAMETERS

SECTION NUMBER	R (/DAY)	D (/DAY)	SATURATION D.O.(MG/L)	INTERFACE NUMBER	XI	E (CU.FT./DAY)	Q (CU.FT./DAY)
				0 - 1	0.100000E 01	0.0	0.432000E 08
1	0.120	0.150	7.770	1 - 2	0.961646E 00	0.331381E 07	0.432000E 08
2	0.140	0.150	7.770	2 - 3	0.884302E 00	0.668249E 07	0.432000E 08
3	0.220	0.150	7.770	3 - 4	0.749900E 00	0.149859E 08	0.433728E 08
4	0.330	0.150	7.770	4 - 5	0.571895E 00	0.227538E 08	0.433728E 08
5	0.270	0.150	7.770	5 - 6	0.534532E 00	0.216904E 08	0.456192E 08
6	0.400	0.150	7.770	6 - 7	0.510267E 00	0.376234E 08	0.746496E 08
7	0.730	0.150	7.770	7 - 8	0.450855E 00	0.497762E 08	0.780192E 08
8	0.500	0.150	7.770	8 - 9	0.539916E 00	0.547181E 08	0.780192E 08
9	0.540	0.150	7.770	9 - 10	0.473002E 00	0.899642E 08	0.780192E 08
10	0.440	0.150	7.770	10 - 11	0.542222E 00	0.122163E 09	0.783648E 08
11	0.390	0.150	7.770	11 - 12	0.477958E 00	0.130143E 09	0.786240E 08
12	0.400	0.150	7.770	12 - 13	0.362903E 00	0.203543E 09	0.788832E 08
13	0.300	0.150	7.770	13 - 14	0.573295E 00	0.350126E 09	0.788832E 08
14	0.410	0.150	7.770	14 - 15	0.500852E 00	0.479984E 09	0.788832E 08
15	0.380	0.150	7.770	15 - 16	0.399182E 00	0.398094E 09	0.788832E 08
16	0.360	0.150	7.770	16 - 17	0.508651E 00	0.105107E 10	0.788832E 08
17	0.360	0.150	7.770	17 - 18	0.490783E 00	0.137087E 10	0.788832E 08
18	0.360	0.150	7.770	18 - 19	0.491657E 00	0.154744E 10	0.788832E 08
19	0.360	0.150	7.770	19 - 20	0.460222E 00	0.116352E 10	0.788832E 08
20	0.360	0.150	7.770	20 - 21	0.507576E 00	0.126231E 10	0.788832E 08
21	0.360	0.150	7.770	21 - 22	0.500000E 00	0.123936E 10	0.788832E 08

DIAGONAL MATRIX ELEMENTS

A-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
A(1, 1)=	0.82356864E 08	A(1, 2)=	-0.16569040E 07	A(2, 1)=	-0.44856880E 08
A(2, 2)=	0.82541184E 08	A(2, 3)=	-0.16843470E 07	A(3, 2)=	-0.44884320E 08
A(3, 3)=	0.98695408E 08	A(3, 4)=	-0.41383280E 07	A(4, 3)=	-0.47511120E 08
A(4, 4)=	0.11169682E 09	A(4, 5)=	-0.41857280E 07	A(5, 4)=	-0.47558512E 08
A(5, 5)=	0.11776109E 09	A(5, 6)=	-0.45620800E 06	A(6, 5)=	-0.46075392E 08
A(6, 6)=	0.15417074E 09	A(6, 7)=	-0.10649600E 07	A(7, 6)=	-0.75714544E 08
A(7, 7)=	0.20001643E 09	A(7, 8)=	-0.69323200E 07	A(8, 7)=	-0.84951504E 08
A(8, 8)=	0.20277424E 09	A(8, 9)=	-0.18822752E 08	A(9, 8)=	-0.96841936E 08
A(9, 9)=	0.26419011E 09	A(9,10)=	-0.48848224E 08	A(10, 9)=	-0.12686741E 09
A(10,10)=	0.31100186E 09	A(10,11)=	-0.86289104E 08	A(11,10)=	-0.16465389E 09
A(11,11)=	0.39201152E 09	A(11,12)=	-0.89098464E 08	A(12,11)=	-0.16772245E 09
A(12,12)=	0.69926784E 09	A(12,13)=	-0.15328653E 09	A(13,12)=	-0.23216971E 09
A(13,13)=	0.80363571E 09	A(13,14)=	-0.31646618E 09	A(14,13)=	-0.39534925E 09
A(14,14)=	0.12109588E 10	A(14,15)=	-0.44060954E 09	A(15,14)=	-0.51949286E 09
A(15,15)=	0.13651917E 10	A(15,16)=	-0.35069901E 09	A(16,15)=	-0.42958234E 09
A(16,16)=	0.21093960E 10	A(16,17)=	-0.10123144E 10	A(17,16)=	-0.10911977E 10
A(17,17)=	0.32019016E 10	A(17,18)=	-0.13307044E 10	A(18,17)=	-0.14095875E 10
A(18,18)=	0.37194258E 10	A(18,19)=	-0.15073385E 10	A(19,18)=	-0.15862218E 10
A(19,19)=	0.36371612E 10	A(19,20)=	-0.11209403E 10	A(20,19)=	-0.11998234E 10
A(20,20)=	0.32107914E 10	A(20,21)=	-0.12234683E 10	A(21,20)=	-0.13023516E 10
A(21,21)=	0.34772705E 10				

DIAGONAL MATRIX ELEMENTS

B-MATRIX

MAIN DIAGONAL ELEMENTS		UPPER DIAGONAL ELEMENTS		LOWER DIAGONAL ELEMENTS	
B(1, 1)=	0.74856864E 08	B(1, 2)=	-0.16569040E 07	B(2, 1)=	-0.44856880E 08
B(2, 2)=	0.80141184E 08	B(2, 3)=	-0.16843470E 07	B(3, 2)=	-0.44884320E 08
B(3, 3)=	0.12179539E 09	B(3, 4)=	-0.41383280E 07	B(4, 3)=	-0.47511120E 08
B(4, 4)=	0.18369682E 09	B(4, 5)=	-0.41857280E 07	B(5, 4)=	-0.47558512E 08
B(5, 5)=	0.17176107E 09	B(5, 6)=	-0.45620800E 06	B(6, 5)=	-0.46075392E 08
B(6, 6)=	0.28417050E 09	B(6, 7)=	-0.10649600E 07	B(7, 6)=	-0.75714544E 08
B(7, 7)=	0.64081613E 09	B(7, 8)=	-0.69323200E 07	B(8, 7)=	-0.84951504E 08
B(8, 8)=	0.43377408E 09	B(8, 9)=	-0.18822752E 08	B(9, 8)=	-0.96841936E 08
B(9, 9)=	0.57228979E 09	B(9,10)=	-0.48848224E 08	B(10, 9)=	-0.12686741E 09
B(10,10)=	0.49950182E 09	B(10,11)=	-0.86289104E 08	B(11,10)=	-0.16465389E 09
B(11,11)=	0.61281126E 09	B(11,12)=	-0.89098464E 08	B(12,11)=	-0.16772345E 09
B(12,12)=	0.13292677E 10	B(12,13)=	-0.15328653E 09	B(13,12)=	-0.23216971E 09
B(13,13)=	0.10586358E 10	B(13,14)=	-0.31646618E 09	B(14,13)=	-0.39536925E 09
B(14,14)=	0.18609587E 10	B(14,15)=	-0.44060954E 09	B(15,14)=	-0.51949286E 09
B(15,15)=	0.21241917E 10	B(15,16)=	-0.35069901E 09	B(16,15)=	-0.42958234E 09
B(16,16)=	0.30438953E 10	B(16,17)=	-0.10123144E 10	B(17,16)=	-0.10911977E 10
B(17,17)=	0.42939013E 10	B(17,18)=	-0.13307044E 10	B(18,17)=	-0.14095875E 10
B(18,18)=	0.48429220E 10	B(18,19)=	-0.15073385E 10	B(19,18)=	-0.15862218E 10
B(19,19)=	0.49391575E 10	B(19,20)=	-0.11209403E 10	B(20,19)=	-0.11998234E 10
B(20,20)=	0.43132887E 10	B(20,21)=	-0.12234683E 10	B(21,20)=	-0.13023516E 10
B(21,21)=	0.48422666E 10				

I	J	1	2	3	4	5
1		0.19644471E-03	0.39809856E-05	0.69193050E-07	0.26030185E-08	0.92629779E-10
2		0.10777620E-03	0.19787614E-03	0.34392615E-05	0.12938375E-06	0.46041890E-08
3		0.49918046E-04	0.91649155E-04	0.16669781E-03	0.62711115E-05	0.22316078E-06
4		0.21559681E-04	0.39583421E-04	0.71997129E-04	0.14815708E-03	0.52722480E-05
5		0.87171229E-05	0.16004575E-04	0.29110248E-04	0.59903687E-04	0.13815780E-03
6		0.26121306E-05	0.47958501E-05	0.87230237E-05	0.17950428E-04	0.41399719E-04
7		0.10039403E-05	0.18432283E-05	0.33525921E-05	0.68990321E-05	0.15911472E-04
8		0.43686208E-06	0.80207593E-06	0.14588713E-05	0.30020974E-05	0.69238331E-05
9		0.17522098E-06	0.32170419E-06	0.58513791E-06	0.12041100E-05	0.27770802E-05
10		0.81580481E-07	0.14978110E-06	0.27243181E-06	0.56061708E-06	0.12929704E-05
11		0.36410608E-07	0.66849566E-07	0.12159057E-06	0.25021183E-06	0.57707234E-06
12		0.94371266E-08	0.17326499E-07	0.31514624E-07	0.64851463E-07	0.14956919E-06
13		0.32110234E-08	0.58954086E-08	0.10722982E-07	0.22065986E-07	0.50891568E-07
14		0.12307055E-08	0.22595656E-08	0.41098538E-08	0.84573450E-08	0.19505478E-07
15		0.50125726E-09	0.92030361E-09	0.16739126E-08	0.34446144E-08	0.79444362E-08
16		0.12822847E-09	0.23542635E-09	0.42820969E-09	0.88117980E-09	0.20322961E-08
17		0.54482502E-10	0.10002936E-09	0.18194034E-09	0.37440073E-09	0.86349439E-09
18		0.25944885E-10	0.47634563E-10	0.86641028E-10	0.17829162E-09	0.41120085E-09
19		0.13070873E-10	0.23997998E-10	0.43649265E-10	0.89822288E-10	0.20716046E-09
20		0.56975034E-11	0.10460552E-10	0.19026405E-10	0.39152931E-10	0.90299782E-10
21		0.21339007E-11	0.39178183E-11	0.71260133E-11	0.14664048E-10	0.33820238E-10

I	J	6	7	8	9	10
1		0.27483105E-12	0.14857055E-14	0.52756640E-16	0.41128065E-17	0.73728810E-18
2		0.13660557E-10	0.73847395E-13	0.26222840E-14	0.20442823E-15	0.36647132E-16
3		0.66211459E-09	0.35793165E-11	0.12709967E-12	0.99084491E-14	0.17762529E-14
4		0.15642680E-07	0.84562607E-10	0.30027716E-11	0.23409047E-12	0.41964563E-13
5		0.40991227E-06	0.22159392E-08	0.78686779E-10	0.61342728E-11	0.10996690E-11
6		0.10418006E-03	0.56318589E-06	0.19998417E-07	0.15590385E-08	0.27948310E-09
7		0.40040381E-04	0.81434730E-04	0.28917020E-05	0.22543151E-06	0.40412296E-07
8		0.17423459E-04	0.35436125E-04	0.83215127E-04	0.64872902E-05	0.11629527E-05
9		0.69883654E-05	0.14213060E-04	0.33376753E-04	0.68869034E-04	0.12345907E-04
10		0.32536891E-05	0.66174016E-05	0.15539757E-04	0.32064505E-04	0.64465887E-04
11		0.14521711E-05	0.29534467E-05	0.69356320E-05	0.14310881E-04	0.28772134E-04
12		0.37638290E-06	0.76549298E-06	0.17976190E-05	0.37091841E-05	0.74573445E-05
13		0.12806584E-06	0.26046206E-06	0.61164781E-06	0.12620649E-05	0.25373911E-05
14		0.49084470E-07	0.99828696E-07	0.23442936E-06	0.48371840E-06	0.97251996E-06
15		0.19991742E-07	0.40659501E-07	0.95481369E-07	0.19701497E-06	0.39610023E-06
16		0.51141598E-08	0.10401248E-07	0.24425447E-07	0.50399098E-07	0.10132783E-06
17		0.21729336E-08	0.44193449E-08	0.10378031E-07	0.21413868E-07	0.43052783E-07
18		0.10347634E-08	0.21045179E-08	0.49420770E-08	0.10197414E-07	0.20501986E-07
19		0.52130789E-09	0.10602439E-08	0.24897895E-08	0.51373945E-08	0.10329783E-07
20		0.22723440E-09	0.46215276E-09	0.10852819E-08	0.22393554E-08	0.45022404E-08
21		0.85106672E-10	0.17309129E-09	0.40647374E-09	0.83871221E-09	0.16862369E-08

I	J	11	12	13	14	15
1		0.17244999E-18	0.23743980E-19	0.53340322E-20	0.16364856E-20	0.56532019E-21
2		0.85716748E-17	0.11802006E-17	0.26512974E-18	0.81341995E-19	0.28099400E-19
3		0.41546119E-15	0.57203258E-16	0.12850599E-16	0.39425719E-17	0.13619521E-17
4		0.98154076E-14	0.13514468E-14	0.30359969E-15	0.93144613E-16	0.32176571E-16
5		0.25721000E-12	0.35414275E-13	0.79557468E-14	0.24408279E-14	0.84317789E-15
6		0.65370445E-10	0.90006154E-11	0.20219694E-11	0.62034172E-12	0.21429538E-12
7		0.94523394E-08	0.13014581E-08	0.29236968E-09	0.89699234E-10	0.30986352E-10
8		0.27201196E-06	0.37452345E-07	0.84135863E-08	0.25812963E-08	0.89170094E-09
9		0.28876793E-05	0.39759391E-06	0.89318576E-07	0.27403036E-07	0.94662909E-08
10		0.15078424E-04	0.20760936E-05	0.46638957E-06	0.14308887E-06	0.49429570E-07
11		0.50099741E-04	0.68980553E-05	0.15496316E-05	0.47542881E-06	0.16423530E-06
12		0.12985171E-04	0.26513138E-04	0.59561135E-05	0.18273422E-05	0.63124924E-06
13		0.44182570E-05	0.90212061E-05	0.25475238E-04	0.78158346E-05	0.26999523E-05
14		0.16934091E-05	0.34576060E-05	0.97640323E-05	0.18506966E-04	0.63931684E-05
15		0.68971315E-06	0.14082561E-05	0.39768183E-05	0.75377566E-05	0.15148203E-04
16		0.17643799E-06	0.36025136E-06	0.10173244E-05	0.19282606E-05	0.38751186E-05
17		0.74965953E-07	0.15306574E-06	0.43224685E-06	0.81929107E-06	0.16464828E-05
18		0.35699234E-07	0.72890771E-07	0.20583849E-06	0.39015123E-06	0.78406458E-06
19		0.17985069E-07	0.36721943E-07	0.10370019E-06	0.19655590E-06	0.39500691E-06
20		0.78395637E-08	0.16006847E-07	0.45202174E-07	0.85677300E-07	0.17218093E-06
21		0.29361737E-08	0.59950871E-08	0.16929693E-07	0.32088955E-07	0.64487324E-07

I \ J	16	17	18	19	20
1	0.11806067E-21	0.46536091E-22	0.20920629E-22	0.10015538E-22	0.40786696E-23
2	0.58682390E-20	0.23130900E-20	0.10398660E-20	0.49782500E-21	0.20273152E-21
3	0.28442812E-18	0.11211332E-18	0.50401355E-19	0.24129120E-19	0.98262110E-20
4	0.67197109E-17	0.26487150E-17	0.11907488E-17	0.57005871E-18	0.23214752E-18
5	0.17608813E-15	0.69408818E-16	0.31203225E-16	0.14938220E-16	0.60833633E-17
6	0.44753182E-13	0.17640400E-13	0.79303663E-14	0.37965812E-14	0.1546099AE-14
7	0.64711552E-11	0.25507400E-11	0.11467025E-11	0.54897260E-12	0.22356075E-12
8	0.18622186E-09	0.73403186E-10	0.32998909E-10	0.15797905E-10	0.64334588E-11
9	0.19769306E-08	0.77924822E-09	0.35031622E-09	0.16771046E-09	0.68297576E-10
10	0.10322822E-07	0.40689514E-08	0.18292259E-08	0.87572372E-09	0.35662540E-09
11	0.34298729E-07	0.13519553E-07	0.60778085E-08	0.29096914E-08	0.11849279E-08
12	0.13182944E-06	0.51963323E-07	0.23360464E-07	0.11183591E-07	0.45543516E-08
13	0.56385562E-06	0.22225538E-06	0.99916406E-07	0.47834000E-07	0.19479678E-07
14	0.13351428E-05	0.52627433E-06	0.23659027E-06	0.11326523E-06	0.46125589E-07
15	0.31635363E-05	0.12469727E-05	0.56058553E-06	0.26837461E-06	0.10929153E-06
16	0.10337174E-04	0.40746108E-05	0.18317696E-05	0.87694139E-06	0.35712117E-06
17	0.43921236E-05	0.79612546E-05	0.35790363E-05	0.17134280E-05	0.69776803E-06
18	0.20915541E-05	0.37911959E-05	0.71096938E-05	0.34036957E-05	0.13861045E-05
19	0.10537115E-05	0.19099834E-05	0.35818221E-05	0.67964620E-05	0.27677579E-05
20	0.45930545E-06	0.83254866E-06	0.15612914E-05	0.29625317E-05	0.70192100E-05
21	0.17202501E-06	0.31181679E-06	0.58475422E-06	0.11095644E-05	0.26289244E-05

I	J 21
1	0.14350705E-23
2	0.71330621E-22
3	0.34573274E-20
4	0.81680570E-19
5	0.21404159E-17
6	0.54399124E-15
7	0.78659193E-13
8	0.22635921E-11
9	0.24030278E-10
10	0.12547753E-09
11	0.41691339E-09
12	0.16024342E-08
13	0.68538633E-08
14	0.16229141E-07
15	0.38453919E-07
16	0.12565204E-06
17	0.24550758E-06
18	0.48769675E-06
19	0.97382781E-06
20	0.24696892E-05
21	0.55262881E-05

ALPHA A MATRIX INVERSE L

I	FINAL ANSWERS
1	0.45443794E-05
2	0.22587976E-03
3	0.10948177E-01
4	0.11211649E-01
5	0.17491460E 00
6	0.52816373E 00
7	0.20301640E 00
8	0.88995576E-01
9	0.42475488E-01
10	0.28723411E-01
11	0.13817206E-01
12	0.35812324E-02
13	0.12185287E-02
14	0.46703196E-03
15	0.19021875E-03
16	0.48660499E-04
17	0.20675172E-04
18	0.98456394E-05
19	0.49601749E-05
20	0.21621026E-05
21	0.80977918E-06

I	J	1	2	3	4	5
1		0.21644370E-03	0.45101733E-05	0.62929132E-07	0.14266754E-08	0.34782302E-10
2		0.12210278E-03	0.20376421E-03	0.28430622E-05	0.64455435E-07	0.15714217E-08
3		0.45399094E-04	0.75761694E-04	0.13359697E-03	0.30287947E-05	0.73841932E-07
4		0.11816545E-04	0.19719373E-04	0.34772864E-04	0.88441593E-04	0.21562028E-05
5		0.32732660E-05	0.54624034E-05	0.96323156E-05	0.24498935E-04	0.93789989E-04
6		0.53096301E-06	0.88606765E-06	0.15624773E-05	0.39740189E-05	0.15213877E-04
7		0.62869219E-07	0.10491561E-06	0.18500674E-06	0.47054800E-06	0.18014134E-05
8		0.12405692E-07	0.20702537E-07	0.36506545E-07	0.92851110E-07	0.35546475E-06
9		0.21481539E-08	0.35848251E-08	0.63214252E-08	0.16077955E-07	0.61551816E-07
10		0.57269745E-09	0.95571373E-09	0.16852924E-08	0.42863846E-08	0.16409718E-07
11		0.15683337E-09	0.26172220E-09	0.46151727E-09	0.11738266E-08	0.44938062E-08
12		0.20340341E-10	0.33943806E-10	0.59856037E-10	0.15223840E-09	0.58281957E-09
13		0.47838521E-11	0.79832616E-11	0.14077572E-10	0.35804998E-10	0.13707356E-09
14		0.10805159E-11	0.18031583E-11	0.31796649E-11	0.80871854E-11	0.30960456E-10
15		0.27122673E-12	0.45262156E-12	0.79814557E-12	0.20300116E-11	0.77715638E-11
16		0.42250136E-13	0.70506697E-13	0.12433050E-12	0.31622339E-12	0.12106097E-11
17		0.11943741E-13	0.19931624E-13	0.35147100E-13	0.89393499E-13	0.34222842E-12
18		0.38941662E-14	0.64985554E-14	0.11459458E-13	0.29146058E-13	0.11158099E-12
19		0.13423626E-14	0.22401258E-14	0.39502025E-14	0.10046983E-13	0.38463234E-13
20		0.40424330E-15	0.67459822E-15	0.11895750E-14	0.30255775E-14	0.11582932E-13
21		0.10872322E-15	0.18143663E-15	0.31994234E-15	0.81374476E-15	0.31152887E-14

I	J	6	7	8	9	10
1		0.55864455E-13	0.93038628E-16	0.14981440E-17	0.50421767E-19	0.51757822E-20
2		0.25238865E-11	0.42033671E-14	0.67684312E-16	0.22779950E-17	0.23383564E-18
3		0.11859876E-09	0.19751854E-12	0.31805202E-14	0.10704415E-15	0.10988060E-16
4		0.34631134E-08	0.57675930E-11	0.92871999E-13	0.31257161E-14	0.32085417E-15
5		0.15063762E-06	0.25087732E-09	0.40397234E-11	0.13596161E-12	0.13956440E-13
6		0.56353660E-04	0.93853430E-07	0.15112640E-08	0.50863341E-10	0.52211178E-11
7		0.66726179E-05	0.25032670E-04	0.40308601E-06	0.13566318E-07	0.13925820E-08
8		0.13166773E-05	0.49395821E-05	0.37244332E-04	0.12535002E-05	0.12867179E-06
9		0.22799406E-06	0.85533225E-06	0.64491842E-05	0.28825933E-04	0.29589810E-05
10		0.60783236E-07	0.22803152E-06	0.17193524E-05	0.76849919E-05	0.34411350E-04
11		0.16645490E-07	0.62446418E-07	0.47084467E-06	0.21045353E-05	0.94235584E-05
12		0.21588198E-08	0.80989260E-08	0.61065691E-07	0.27294561E-06	0.12221781E-05
13		0.50773385E-09	0.19047888E-08	0.14362065E-07	0.64194182E-07	0.28744472E-06
14		0.11468056E-09	0.43022985E-09	0.32439216E-08	0.14499385E-07	0.64924393E-07
15		0.28786612E-10	0.10799450E-09	0.81427576E-09	0.36395729E-08	0.16297044E-07
16		0.44842125E-11	0.16822752E-10	0.12684319E-09	0.56695182E-09	0.25386611E-08
17		0.12676466E-11	0.47556386E-11	0.35857456E-10	0.16027207E-09	0.71765704E-09
18		0.41330654E-12	0.15505409E-11	0.11691054E-10	0.52255533E-10	0.23398661E-09
19		0.14247148E-12	0.53448901E-12	0.40300333E-11	0.18013063E-10	0.80657800E-10
20		0.42904259E-13	0.16095767E-12	0.12136169E-11	0.54245037E-11	0.24289543E-10
21		0.11539323E-13	0.43290370E-13	0.32640833E-12	0.14589484E-11	0.65327917E-11

I	J	11	12	13	14	15
1		0.74280274E-21	0.51176714E-22	0.79467718E-23	0.14367784E-23	0.30589028E-24
2		0.33558911E-19	0.23121007E-20	0.35902526E-21	0.64911906E-22	0.13819745E-22
3		0.15769504E-17	0.10864676E-18	0.16870778E-19	0.30502451E-20	0.64939716E-21
4		0.46047358E-16	0.31725131E-17	0.49263108E-18	0.89067913E-19	0.18962560E-19
5		0.20029566E-14	0.13799719E-15	0.21428345E-16	0.38742551E-17	0.82482909E-18
6		0.74930757E-12	0.51624869E-13	0.80163605E-14	0.14493625E-14	0.30856902E-15
7		0.19985608E-09	0.13769435E-10	0.21381317E-11	0.38657543E-12	0.82301841E-13
8		0.18466295E-07	0.12722678E-08	0.19755914E-09	0.35718803E-10	0.76045255E-11
9		0.42465740E-06	0.29257524E-07	0.45431392E-08	0.82140206E-09	0.17487643E-09
10		0.49385380E-05	0.34024936E-06	0.52834277E-07	0.95524690E-08	0.20337194E-08
11		0.27963368E-04	0.19265854E-05	0.29916220E-06	0.54088744E-07	0.11515478E-07
12		0.36266856E-05	0.12622109E-04	0.19599738E-05	0.35436449E-06	0.75444120E-07
13		0.85296188E-06	0.29686007E-05	0.16669132E-04	0.30137899E-05	0.64163561E-06
14		0.19265627E-06	0.67050962E-06	0.37650161E-05	0.98216933E-05	0.20910375E-05
15		0.48359745E-07	0.16830853E-06	0.94507845E-06	0.24654009E-05	0.82559836E-05
16		0.75332061E-08	0.26218125E-07	0.14721888E-06	0.38404545E-06	0.12860692E-05
17		0.21295690E-08	0.74116322E-08	0.41617458E-07	0.10856633E-06	0.36356005E-06
18		0.69433037E-09	0.24165070E-08	0.13569064E-07	0.35397225E-07	0.11853615E-06
19		0.23934343E-09	0.83299767E-09	0.46774069E-08	0.12201831E-07	0.40860744E-07
20		0.72076567E-10	0.25085134E-09	0.14085684E-08	0.36744956E-08	0.12304930E-07
21		0.19385368E-10	0.67467670E-10	0.37884162E-09	0.98827369E-09	0.33094740E-08

I	J	16	17	18	19	20
1		0.38900016E-25	0.10201709E-25	0.31400533E-26	0.10285841E-26	0.28938580E-27
2		0.17574543E-23	0.46090061E-24	0.14186381E-24	0.46470172E-25	0.13074103E-25
3		0.82583677E-22	0.21657955E-22	0.66662533E-23	0.21836569E-23	0.61435910E-24
4		0.24114641E-20	0.63241775E-21	0.19465630E-21	0.63763324E-22	0.17939454E-22
5		0.10489327E-18	0.27508751E-19	0.84671112E-20	0.27735622E-20	0.78032576E-21
6		0.39240654E-16	0.10291047E-16	0.31675525E-17	0.10375914E-17	0.29192041E-18
7		0.10466305E-13	0.27448382E-14	0.84485247E-15	0.27674747E-15	0.77861320E-16
8		0.96706497E-12	0.25361749E-12	0.78062665E-13	0.25570905E-13	0.71942303E-14
9		0.22238975E-10	0.58322826E-11	0.17951560E-11	0.58803776E-12	0.16544107E-12
10		0.25862734E-09	0.67826328E-10	0.20876703E-10	0.68385644E-11	0.19239905E-11
11		0.14644197E-08	0.38405168E-09	0.11820969E-09	0.38721845E-10	0.10894168E-10
12		0.95942063E-08	0.25161295E-08	0.77445539E-09	0.25368774E-09	0.71373560E-10
13		0.81596568E-07	0.21399117E-07	0.65865677E-08	0.21575579E-08	0.60701622E-09
14		0.26591658E-06	0.69737951E-07	0.21465091E-07	0.70313035E-08	0.19782160E-08
15		0.10499107E-05	0.27534441E-06	0.84750013E-07	0.27761498E-07	0.78105309E-08
16		0.59654321E-05	0.15644646E-05	0.48153657E-06	0.15773657E-06	0.44378236E-07
17		0.16863751E-05	0.45872957E-05	0.14119532E-05	0.46251222E-06	0.13012504E-06
18		0.54982974E-06	0.14956540E-05	0.41612075E-05	0.13630834E-05	0.38349521E-06
19		0.18953261E-06	0.51556913E-06	0.14344168E-05	0.39469260E-05	0.11104439E-05
20		0.57076413E-07	0.15526001E-06	0.43196468E-06	0.11885886E-05	0.43502296E-05
21		0.15350970E-07	0.41757971E-07	0.11617914E-06	0.31967693E-06	0.11700167E-05

I	J 21
1	0.73117629E-28
2	0.33033612E-26
3	0.15522682E-24
4	0.45326622E-23
5	0.19716059E-21
6	0.73757886E-19
7	0.19672777E-16
8	0.18177251E-14
9	0.41801062E-13
10	0.48612405E-12
11	0.27525681E-11
12	0.18033561E-10
13	0.15337140E-09
14	0.49982463E-09
15	0.19734439E-08
16	0.11212805E-07
17	0.32877978E-07
18	0.96895633E-07
19	0.28056974E-06
20	0.10991498E-05
21	0.35998619E-05

ALPHA B MATRIX INVERSE F

I	FINAL ANSWERS
1	-0.38415543E-02
2	-0.17355675E 00
3	-0.15060654E 01
4	-0.26199942E 01
5	-0.30891132E 01
6	-0.26022635E 01
7	-0.18353462E 01
8	-0.18310022E 01
9	-0.16112576E 01
10	-0.15556459E 01
11	-0.13702049E 01
12	-0.11081715E 01
13	-0.99193245E 00
14	-0.88227552E 00
15	-0.940*8726E 00
16	-0.82828283E 00
17	-0.80633312E 00
18	-0.78522062E 00
19	-0.58843279E 00
20	-0.62664169E 00
21	-0.49962330E 00

I	J	1	2	3	4	5
1		0.26880286E-11	0.10999611E-12	0.25676213E-14	0.10969013E-15	0.41992287E-17
2		0.28806662E-11	0.25668287E-11	0.74241557E-13	0.33846547E-14	0.13381078E-15
3		0.14886582E-11	0.17210781E-11	0.14221376E-11	0.81305242E-13	0.35213711E-14
4		0.50674666E-12	0.86695531E-12	0.76847090E-12	0.84081998E-12	0.48261091E-13
5		0.19116994E-12	0.27801530E-12	0.38250707E-12	0.58199268E-12	0.81846238E-12
6		0.40212215E-13	0.61992403E-13	0.92777023E-13	0.15764272E-12	0.27860928E-12
7		0.63425285E-14	0.10243285E-13	0.16265567E-13	0.29531563E-13	0.58048889E-13
8		0.22806820E-14	0.39107443E-14	0.66463423E-14	0.12899516E-13	0.27765361E-13
9		0.72417484E-15	0.12816909E-14	0.22503978E-14	0.44962881E-14	0.10026183E-13
10		0.37568643E-15	0.67699024E-15	0.12098072E-14	0.24536787E-14	0.55673477E-14
11		0.16458227E-15	0.29867504E-15	0.53734923E-15	0.10959418E-14	0.25025120E-14
12		0.29057373E-16	0.52895699E-16	0.95444983E-16	0.19513417E-15	0.44678892E-15
13		0.10332497E-16	0.18863702E-16	0.34130610E-16	0.69934958E-16	0.16052802E-15
14		0.31000992E-17	0.56676703E-17	0.10268095E-16	0.21062162E-16	0.48403539E-16
15		0.10292873E-17	0.18837169E-17	0.34160301E-17	0.70125899E-17	0.16129943E-16
16		0.21291712E-18	0.38997244E-18	0.70771919E-18	0.14537104E-17	0.33459845E-17
17		0.76760241E-19	0.14066496E-18	0.25540194E-18	0.52482345E-18	0.12085059E-17
18		0.32151580E-19	0.58963081E-19	0.10706328E-18	0.22007331E-18	0.50694012E-18
19		0.14304832E-19	0.26233826E-19	0.47665045E-19	0.98001877E-19	0.22581064E-18
20		0.58731342E-20	0.10774009E-19	0.19581317E-19	0.40269511E-19	0.92810337E-19
21		0.20202925E-20	0.37068128E-20	0.67381196E-20	0.13859030E-19	0.31946197E-19

I	J	6	7	8	9	10
1		0.12822592E-19	0.69793124E-22	0.24860983E-23	0.19403099E-24	0.34803511E-25
2		0.41343935E-18	0.22564952E-20	0.80478542E-22	0.62838703E-23	0.11273990E-23
3		0.11219668E-16	0.6166186VE-19	0.22061073E-20	0.17244988E-21	0.30957388E-22
4		0.16572709E-15	0.92538598E-18	0.33342458E-19	0.26129196E-20	0.46966229E-21
5		0.34086810E-14	0.19709464E-16	0.72085906E-18	0.56788431E-19	0.10234829E-19
6		0.36756308E-12	0.24668047E-14	0.95445803E-16	0.76621583E-17	0.13939747E-17
7		0.10658369E-12	0.12854848E-12	0.66586988E-14	0.57814742E-15	0.10908658E-15
8		0.62076863E-13	0.10884447E-12	0.19734800E-12	0.20840792E-13	0.42390713E-14
9		0.23880918E-13	0.45554970E-13	0.96890215E-13	0.13301957E-12	0.35413689E-13
10		0.13650180E-13	0.26958308E-13	0.60617310E-13	0.10724077E-12	0.15375104E-12
11		0.61989056E-14	0.12387359E-13	0.28353015E-13	0.53618761E-13	0.90861184E-13
12		0.11115435E-14	0.22321326E-14	0.51462300E-14	0.99851903E-14	0.17878338E-13
13		0.40095427E-15	0.80875405E-15	0.18767489E-14	0.37234586E-14	0.69693397E-14
14		0.12112619E-15	0.24483127E-15	0.56986873E-15	0.11422076E-14	0.21797114E-14
15		0.40419790E-16	0.81825818E-16	0.19087940E-15	0.38541037E-15	0.74557513E-15
16		0.83934521E-17	0.17011399E-16	0.39749814E-16	0.80703380E-16	0.15769146E-15
17		0.30336369E-17	0.61530971E-17	0.14393326E-16	0.29327020E-16	0.57672197E-16
18		0.12732394E-17	0.25840692E-17	0.60499312E-17	0.12362045E-16	0.24433393E-16
19		0.56739704E-18	0.11520955E-17	0.26991846E-17	0.55276535E-17	0.10968409E-16
20		0.23329802E-18	0.47391798E-18	0.11110111E-17	0.22798545E-17	0.45400048E-17
21		0.80322495E-19	0.16320853E-18	0.38275508E-18	0.78638556E-18	0.15692907E-17

I	J	11	12	13	14	15
1		0.81424990E-26	0.11211938E-26	0.25188544E-27	0.77280455E-28	0.26696555E-28
2		0.26378897E-24	0.36323895E-25	0.81606336E-26	0.25037634E-26	0.86492898E-27
3		0.72452220E-23	0.99774102E-24	0.22416769E-24	0.68777923E-25	0.23759739E-25
4		0.10998020E-21	0.15147896E-22	0.34037281E-23	0.10443580E-23	0.36078721E-24
5		0.23994379E-20	0.33059416E-21	0.74301218E-22	0.22799708E-22	0.78767888E-23
6		0.32811758E-18	0.45261627E-19	0.10180545E-19	0.31249365E-20	0.10797506E-20
7		0.26067015E-16	0.36115615E-17	0.81470042E-18	0.25035903E-18	0.86552509E-19
8		0.10425104E-14	0.14561727E-15	0.33023935E-16	0.10169535E-16	0.35192118E-17
9		0.94559811E-14	0.13497419E-14	0.31037659E-15	0.96092050E-16	0.33336768E-16
10		0.49601206E-13	0.73850736E-14	0.17423205E-14	0.54463837E-15	0.18979699E-15
11		0.98480740E-13	0.16705865E-13	0.42244718E-14	0.13532266E-14	0.47682703E-15
12		0.23383947E-13	0.23833339E-13	0.84434582E-14	0.29648931E-14	0.10855373E-14
13		0.10313449E-13	0.15434146E-13	0.29741583E-13	0.12309161E-13	0.47737083E-14
14		0.23839148E-14	0.56390202E-14	0.12797448E-13	0.14304025E-13	0.66409958E-14
15		0.11949405E-14	0.21209788E-14	0.52046143E-14	0.73667133E-14	0.92557696E-14
16		0.2584894 7E-15	0.47811579E-15	0.12279047E-14	0.19382369E-14	0.30308222E-14
17		0.95873330E-16	0.18171340E-15	0.47858314E-15	0.79710480E-15	0.13575545E-14
18		0.41061709E-16	0.79261995E-16	0.21256154E-15	0.36702467E-15	0.65792352E-15
19		0.18587569E-16	0.36374043E-16	0.98833313E-16	0.17496666E-15	0.32415845E-15
20		0.77513631E-17	0.15351519E-16	0.42181817E-16	0.76228995E-16	0.14492319E-15
21		0.26911329E-17	0.53669447E-17	0.14841248E-16	0.27129009E-16	0.52295417E-16

I	J	16	17	18	19	20
1		0.55753069E-29	0.21976230E-29	0.98795692E-30	0.47297666E-30	0.19261213E-30
2		0.18063201E-27	0.71200041E-28	0.32008486E-28	0.15323722E-28	0.62403764E-29
3		0.49619875E-26	0.19558891E-26	0.87928601E-27	0.42094858E-27	0.17142575E-27
4		0.75347754E-25	0.29700259E-25	0.13352029E-25	0.63921522E-26	0.26031223E-26
5		0.16450440E-23	0.64844297E-24	0.29151536E-24	0.13956064E-24	0.56834076E-25
6		0.22551920E-21	0.88898200E-22	0.39966028E-22	0.19133651E-22	0.77920391E-23
7		0.18082617E-19	0.71288784E-20	0.32051837E-20	0.15345491E-20	0.62495232E-21
8		0.73560045E-18	0.29006784E-18	0.13043310E-18	0.62452705E-19	0.25435862E-19
9		0.69770054E-17	0.27527934E-17	0.12382546E-17	0.59301617E-18	0.24156254E-18
10		0.39811118E-16	0.15723314E-16	0.70769322E-17	0.33904711E-17	0.13814818E-17
11		0.10056644E-15	0.39815856E-16	0.17946855E-16	0.86058630E-17	0.35089366E-17
12		0.23316234E-15	0.93056337E-16	0.42144693E-16	0.20267725E-16	0.82821277E-17
13		0.10518860E-14	0.42440438E-15	0.19343584E-15	0.93382696E-16	0.38270060E-16
14		0.15659670E-14	0.64913683E-15	0.30043285E-15	0.14636246E-15	0.60390577E-16
15		0.26399728E-14	0.11664673E-14	0.55838402E-15	0.27732155E-15	0.11604120E-15
16		0.46500381E-14	0.25480765E-14	0.13386350E-14	0.69768113E-15	0.30176819E-15
17		0.26503676E-14	0.31416912E-14	0.19786599E-14	0.11138799E-14	0.50535828E-15
18		0.14384701E-14	0.20653829E-14	0.25974403E-14	0.17345386E-14	0.85887214E-15
19		0.75558494E-15	0.11827504E-14	0.17782466E-14	0.22731664E-14	0.13673113E-14
20		0.35372879E-15	0.58491204E-15	0.96445628E-15	0.14984758E-14	0.23402184E-14
21		0.13066298E-15	0.22170995E-15	0.38015601E-15	0.63216441E-15	0.11723262E-14

I	J	21
1		0.67769882E-31
2		0.21956572E-29
3		0.60315672E-28
4		0.91590256E-27
5		0.19997094E-25
6		0.27416261E-23
7		0.21989252E-21
8		0.89500361E-20
9		0.85004854E-19
10		0.48621123E-18
11		0.12353992E-17
12		0.29192230E-17
13		0.13509328E-16
14		0.21391963E-16
15		0.41396260E-16
16		0.10940096E-15
17		0.18726414E-15
18		0.33005676E-15
19		0.56177089E-15
20		0.11394944E-14
21		0.14477343E-14

I	J	1	2	3	4	5
1		0.10080103E-03	0.39598572E-05	0.12709717E-06	0.65814056E-08	0.28344771E-09
2		0.10802493E-03	0.92405782E-04	0.36749543E-05	0.20307920E-06	0.90322203E-08
3		0.55824654E-04	0.61958781E-04	0.70395763E-04	0.48783131E-05	0.23769240E-06
4		0.19002982E-04	0.24010369E-04	0.38039274E-04	0.50449176E-04	0.32576218E-05
5		0.71688692E-05	0.10008545E-04	0.18934079E-04	0.34919547E-04	0.55246172E-04
6		0.15079568E-05	0.22317254E-05	0.45924589E-05	0.94585603E-05	0.18806109E-04
7		0.23784469E-06	0.36875804E-06	0.80514502E-06	0.17718930E-05	0.39182978E-05
8		0.85525528E-07	0.14078671E-06	0.32899368E-06	0.77397073E-06	0.18741603E-05
9		0.27156542E-07	0.46140848E-07	0.11139457E-06	0.26977716E-06	0.67676700E-06
10		0.14088233E-07	0.24371637E-07	0.59885394E-07	0.14722065E-06	0.37579576E-06
11		0.61718310E-08	0.10752295E-07	0.26598769E-07	0.65756467E-07	0.16891943E-06
12		0.10896508E-08	0.19042441E-08	0.47245230E-08	0.11708046E-07	0.30158237E-07
13		0.38746828E-09	0.67909278E-09	0.16894639E-08	0.41960959E-08	0.10835635E-07
14		0.11625366E-09	0.20403604E-09	0.50827031E-09	0.12637293E-08	0.32672371E-08
15		0.38598250E-10	0.67813768E-10	0.16909338E-09	0.42075521E-09	0.10887704E-08
16		0.79843883E-11	0.14039001E-10	0.35032074E-10	0.87222590E-10	0.22585384E-09
17		0.28785073E-11	0.50639354E-11	0.12642387E-10	0.31489394E-10	0.81574109E-10
18		0.12056831E-11	0.21219493E-11	0.52996288E-11	0.13204395E-10	0.34218434E-10
19		0.53643093E-12	0.94440948E-12	0.23594173E-11	0.58801106E-11	0.15242210E-10
20		0.22024239E-12	0.38786395E-12	0.96927414E-12	0.24161697E-11	0.62646945E-11
21		0.75760904E-13	0.13344518E-12	0.33353669E-12	0.83154154E-12	0.21563671E-11

I	J	6	7	8	9	10
1		0.10001618E-11	0.79564109E-14	0.24612363E-15	0.22992656E-16	0.33933405E-17
2		0.32248260E-10	0.25724036E-12	0.79673715E-14	0.74463831E-15	0.10992134E-15
3		0.87513374E-09	0.70294508E-11	0.21840456E-12	0.20435300E-13	0.30183437E-14
4		0.12926709E-07	0.10549396E-09	0.33009021E-11	0.30963079E-12	0.45792048E-13
5		0.26587702E-06	0.22468782E-08	0.71365025E-10	0.67294260E-11	0.99789448E-12
6		0.28669907E-04	0.28121565E-06	0.94491313E-08	0.90796526E-09	0.13591246E-09
7		0.83135255E-05	0.14654523E-04	0.65921103E-06	0.68510417E-07	0.10635933E-07
8		0.48419943E-05	0.12408265E-04	0.19537445E-04	0.24696319E-05	0.41330924E-06
9		0.18627106E-05	0.51932648E-05	0.95921296E-05	0.15762809E-04	0.34528321E-05
10		0.10647136E-05	0.30732454E-05	0.60011125E-05	0.12708026E-04	0.14990718E-04
11		0.48351450E-06	0.14121579E-05	0.28069480E-05	0.63538200E-05	0.88589604E-05
12		0.86700368E-07	0.25446303E-06	0.50947665E-06	0.11832444E-05	0.17431366E-05
13		0.31274425E-07	0.92197922E-07	0.18579806E-06	0.44122964E-06	0.67951026E-06
14		0.94478381E-08	0.27910755E-07	0.56416994E-07	0.13535151E-06	0.21252174E-06
15		0.31527430E-08	0.93281400E-08	0.18897055E-07	0.45671108E-07	0.72693524E-07
16		0.65468897E-09	0.19392989E-08	0.39352308E-08	0.95633439E-08	0.15374908E-07
17		0.23662361E-09	0.70145267E-09	0.14249391E-08	0.34752503E-08	0.56230363E-08
18		0.99312641E-10	0.29458369E-09	0.59894290E-09	0.14649040E-08	0.23822546E-08
19		0.44256959E-10	0.13133884E-09	0.26721914E-09	0.65502648E-09	0.10694192E-08
20		0.18197235E-10	0.54026630E-10	0.10999007E-09	0.27016256E-09	0.44265014E-09
21		0.62651525E-11	0.18605756E-10	0.37892744E-10	0.93186639E-10	0.15300576E-09

I	J	11	12	13	14	15
1		0.11236645E-17	0.42381111E-18	0.64230730E-19	0.28980153E-19	0.13214789E-19
2		0.36402869E-16	0.13730427E-16	0.20809606E-17	0.93891038E-18	0.42813964E-18
3		0.99984023E-15	0.37714587E-15	0.57162746E-16	0.25791703E-16	0.11761066E-16
4		0.15177262E-13	0.57259021E-14	0.86795043E-15	0.39163394E-15	0.17858959E-15
5		0.33112234E-12	0.12496455E-12	0.18946806E-13	0.85498862E-14	0.38990079E-14
6		0.45280210E-10	0.17108884E-10	0.25960380E-11	0.11718499E-11	0.53447633E-12
7		0.35972472E-08	0.13651698E-08	0.20774857E-09	0.93884581E-10	0.42843465E-10
8		0.14386637E-06	0.55043309E-07	0.84211003E-08	0.38135717E-08	0.17420090E-08
9		0.13049248E-05	0.51020226E-06	0.79145991E-07	0.36034500E-07	0.16501691E-07
10		0.68449644E-05	0.27915567E-05	0.44429163E-06	0.20423926E-06	0.93949438E-07
11		0.13590338E-04	0.63148145E-05	0.10772401E-05	0.50745967E-06	0.23602928E-06
12		0.32269836E-05	0.90089989E-05	0.21530814E-05	0.11118336E-05	0.53734072E-06
13		0.14232555E-05	0.58341047E-05	0.75841017E-05	0.46159321E-05	0.23629846E-05
14		0.46698011E-06	0.21315482E-05	0.32633479E-05	0.53640060E-05	0.32872913E-05
15		0.16490173E-06	0.80172970E-06	0.13271756E-05	0.27625156E-05	0.45816041E-05
16		0.35671537E-07	0.18072768E-06	0.31311561E-06	0.72683844E-06	0.15002561E-05
17		0.13230515E-07	0.68687598E-07	0.12203867E-06	0.29891413E-06	0.67198920E-06
18		0.56665144E-08	0.29961022E-07	0.54203181E-07	0.13763417E-06	0.32567198E-06
19		0.25650837E-08	0.13749382E-07	0.25202489E-07	0.65612426E-07	0.16045834E-06
20		0.10696877E-08	0.58028711E-08	0.10756359E-07	0.28585855E-07	0.71736906E-07
21		0.37137604E-09	0.20287043E-08	0.37845140E-08	0.10173373E-07	0.25885219E-07

I	J	16	17	18	19	20
1		0.37215114E-20	0.17141446E-20	0.79283485E-21	0.43986783E-21	0.15168196E-21
2		0.12057171E-18	0.55535976E-19	0.25686795E-19	0.14251046E-19	0.49142929E-20
3		0.33121230E-17	0.15255924E-17	0.70562663E-18	0.39148178E-18	0.13499769E-18
4		0.50294566E-16	0.23166179E-16	0.10714997E-16	0.59446956E-17	0.20499570E-17
5		0.10980656E-14	0.50578518E-15	0.23394076E-15	0.12979126E-15	0.44756797E-16
6		0.15053388E-12	0.69340529E-13	0.32072720E-13	0.17794275E-13	0.61362252E-14
7		0.12070133E-10	0.55605208E-11	0.25721578E-11	0.14271292E-11	0.49214962E-12
8		0.49101256E-09	0.22625275E-09	0.10467249E-09	0.58080957E-10	0.20030727E-10
9		0.46571458E-08	0.21471773E-08	0.99369868E-09	0.55150440E-09	0.19023037E-09
10		0.26573890E-07	0.12264174E-07	0.56792331E-08	0.31531349E-08	0.10879162E-08
11		0.67127985E-07	0.31056345E-07	0.14402342E-07	0.80034432E-08	0.27632858E-08
12		0.15563563E-06	0.72583873E-07	0.33821099E-07	0.18848965E-07	0.65221712E-08
13		0.70213309E-06	0.33103515E-06	0.15523216E-06	0.86845773E-07	0.30137652E-07
14		0.10452814E-05	0.50632639E-06	0.24109721E-06	0.13611691E-06	0.47557549E-07
15		0.17621796E-05	0.90984383E-06	0.44810292E-06	0.25790877E-06	0.91382333E-07
16		0.31038962E-05	0.19874979E-05	0.10742533E-05	0.64884279E-06	0.23764227E-06
17		0.17691182E-05	0.24505171E-05	0.15878732E-05	0.10359072E-05	0.39796936E-06
18		0.96017720E-06	0.16109971E-05	0.20844445E-05	0.16131189E-05	0.67636137E-06
19		0.50435239E-06	0.92254470E-06	0.14270418E-05	0.21140422E-05	0.10767562E-05
20		0.23611369E-06	0.45623108E-06	0.77397573E-06	0.13935805E-05	0.18429200E-05
21		0.87217416E-07	0.17293360E-06	0.30507499E-06	0.58791233E-06	0.92320630E-06

I	J	21
1		0.66075595E-22
2		0.21407646E-20
3		0.58807734E-19
4		0.89300434E-18
5		0.19497150E-16
6		0.26730842E-14
7		0.21439507E-12
8		0.87262810E-11
9		0.82879689E-10
10		0.47405568E-09
11		0.12045136E-08
12		0.28462410E-08
13		0.13171586E-07
14		0.20857151E-07
15		0.40361332E-07
16		0.10666588E-06
17		0.18258243E-06
18		0.32180515E-06
19		0.54772636E-06
20		0.11110060E-05
21		0.14115394E-05

ALPHA BA INVERSE VDL

SECTION NUMBER NUMBER	FINAL ANSWERS
1	0.848998E-05
2	0.246535E-03
3	0.480383E-02
4	0.652980E-02
5	0.708773E-01
6	0.154674E 00
7	0.429225E-01
8	0.247300E-01
9	0.110817E-01
10	0.865148E-02
11	0.451300E-02
12	0.853267E-03
13	0.322235E-03
14	0.994087E-04
15	0.336782E-04
16	0.707312E-05
17	0.257525E-05
18	0.108718E-05
19	0.486707E-06
20	0.200956E-06
21	0.693598E-07

D.O.SATURATION + ALPHA B INVERSE F - ALPHA B A INVERSE V D L

SECTION NUMBER	FINAL ANSWERS
1	0.776615E 01
2	0.759620E 01
3	0.625913E 01
4	0.514348E 01
5	0.461001E 01
6	0.501306E 01
7	0.589173E 01
8	0.591427E 01
9	0.614766E 01
10	0.620570E 01
11	0.639528E 01
12	0.666097E 01
13	0.677774E 01
14	0.688762E 01
15	0.682918E 01
16	0.694171E 01
17	0.696366E 01
18	0.698478E 01
19	0.718157E 01
20	0.714336E 01
21	0.727038E 01